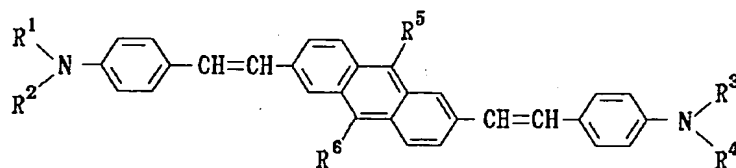


What is Claimed is:

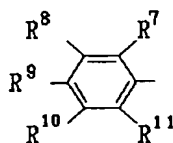
1. A bis(aminostyryl)anthracene compound represented by the general formula [I], [II], [III], or [IV] below.

General formula [I]



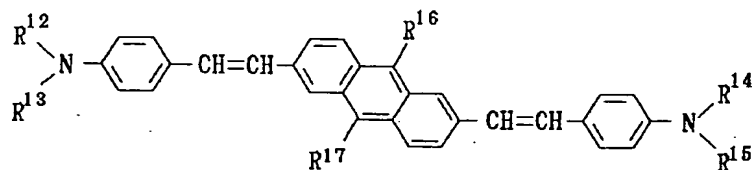
(where R² and R³ each denotes an unsubstituted aryl group, and R¹ and R⁴ each denotes an aryl group represented by the general formula (1) below.)

General formula (1)



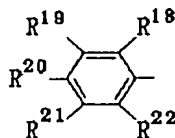
(where R⁷, R⁸, R⁹, R¹⁰, and R¹¹ are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having at least one carbon; and R⁵ and R⁶ are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [II]



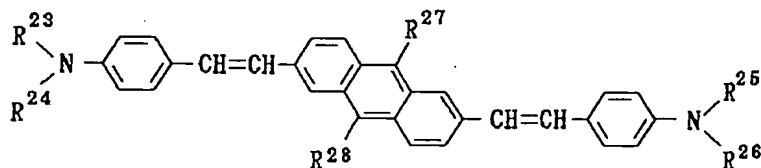
(where R¹², R¹³, R¹⁴, and R¹⁵ are identical or different groups, each denoting an aryl group represented by the general formula (2) below.)

General formula (2)



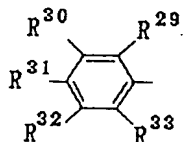
(where R¹⁸, R¹⁹, R²⁰, R²¹, and R²² are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having at least one carbon; and R¹⁶ and R¹⁷ are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [III]



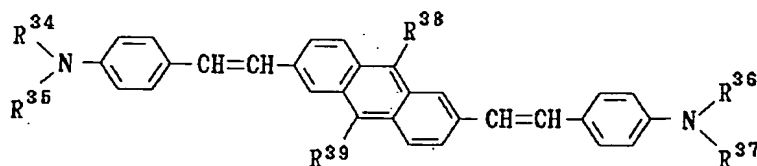
(where at least one of R^{23} , R^{24} , R^{25} , and R^{26} denotes an aryl group represented by the general formula (3) below, with the remainder being an unsubstituted aryl group.)

General formula (3)



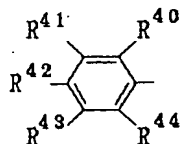
(where R^{29} , R^{30} , R^{31} , R^{32} , and R^{33} are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon amino group; and R^{27} and R^{28} are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [IV]



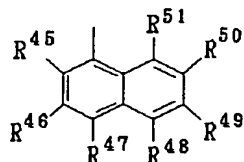
(where R^{35} and R^{36} are identical or different groups, each denoting an aryl group represented by the general formula (4) below.)

General formula (4)



(where R⁴⁰, R⁴¹, R⁴², R⁴³, and R⁴⁴ are identical or different groups, each denoting hydrogen or at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having one or more carbons; and R³⁴ and R³⁷ are identical or different groups, at least one of them being an aryl group represented by the general formula (5) below.)

General formula (5)

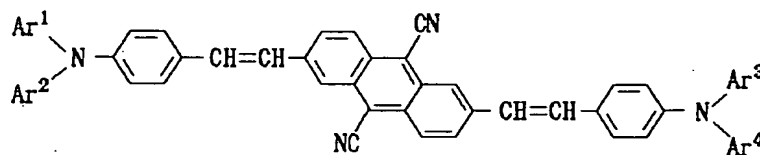


(where R⁴⁵, R⁴⁶, R⁴⁷, R⁴⁸, R⁴⁹, R⁵⁰, and R⁵¹ are identical or different groups, each denoting a hydrogen atom or at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group, or hydrocarbon amino group having one or more carbons; and R³⁸ and R³⁹ are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group,

trifluoromethyl group, or halogen atom.)

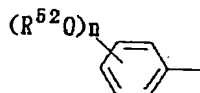
2. A bis(aminostyryl)anthracene compound represented by the general formula (6) below.

General formula (6)

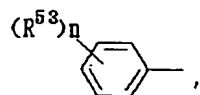


(where Ar¹, Ar², Ar³, and Ar⁴ are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8), (9), (10), (11), (12), (12'), or (12'') below.

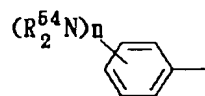
General formula (7)



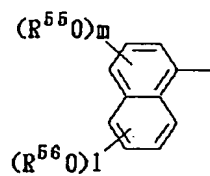
General formula (8)



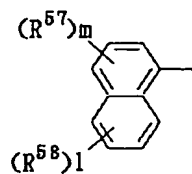
General formula (9)



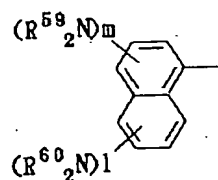
General formula (10)



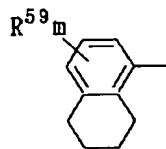
General formula (11)



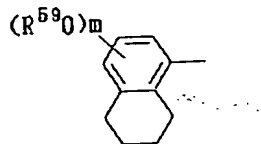
General formula (12)



General formula (12')



General formula (12")

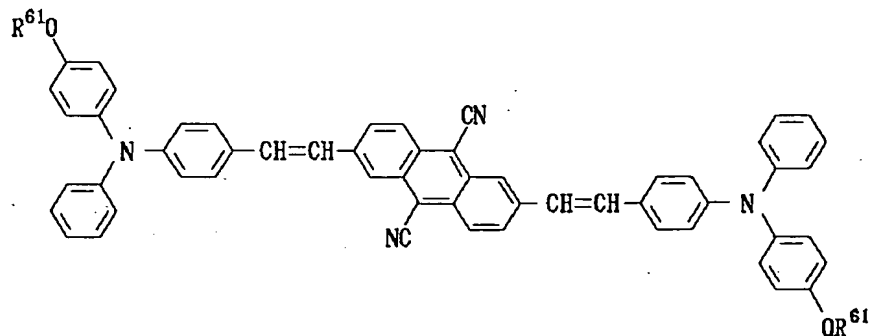


(where R^{52} , R^{53} , and R^{54} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} are identical or different, each denoting a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6; m is an integer of 0 to 3; and l is an integer of 0 to 4.)

3. A bis(aminostyryl)anthracene compound as defined in Claim 2, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has a carbon number of 1 to 6.

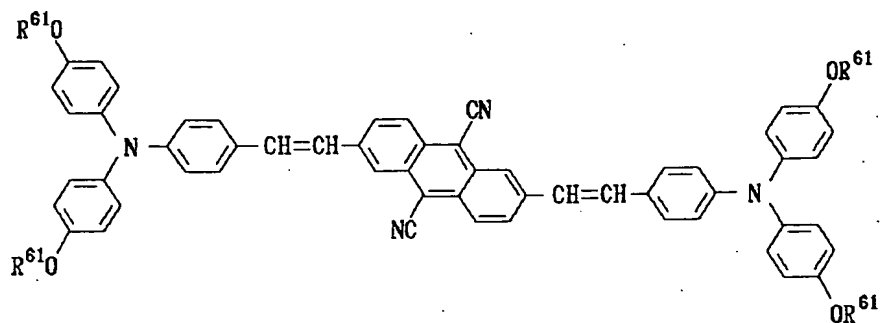
4. A bis(aminostyryl)anthracene compound as defined in Claim 1 or 2 which is represented by the general formula (13), (13'), (14), (15), (16), (17), (17'), or (17'') below.

General formula (13)



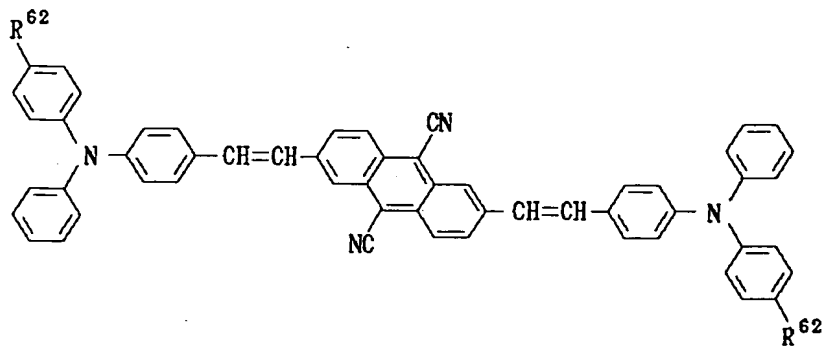
(where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (13')



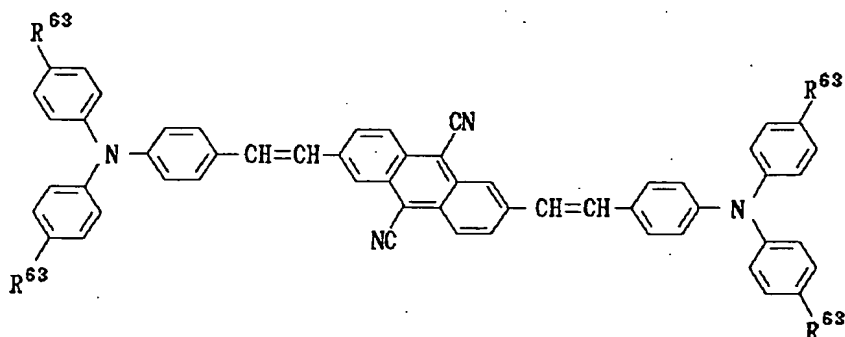
(where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (14)



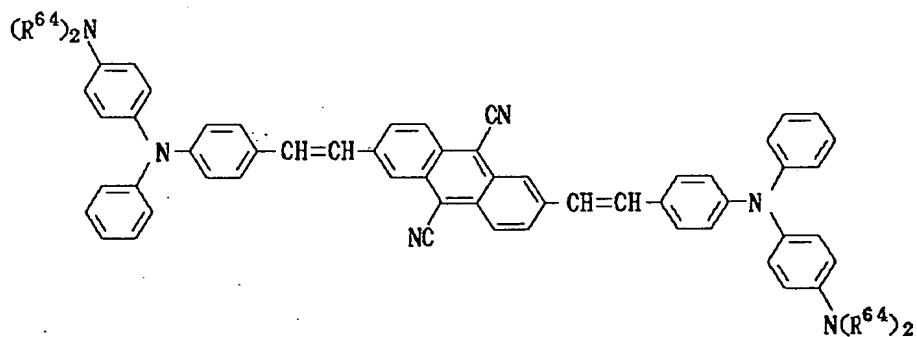
(where R^{62} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (15)



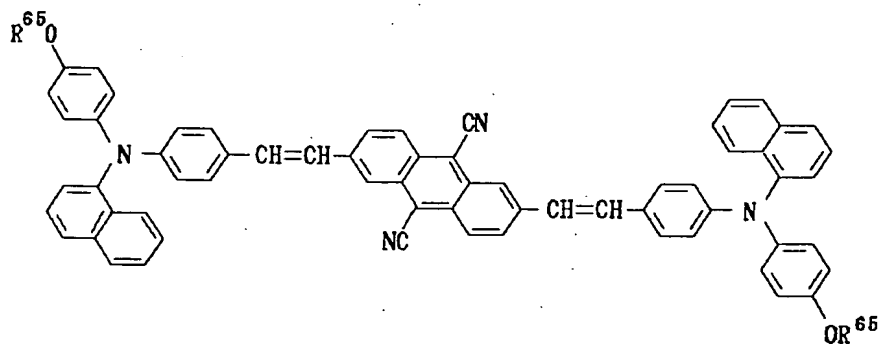
(where R^{63} denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.)

General formula (16)



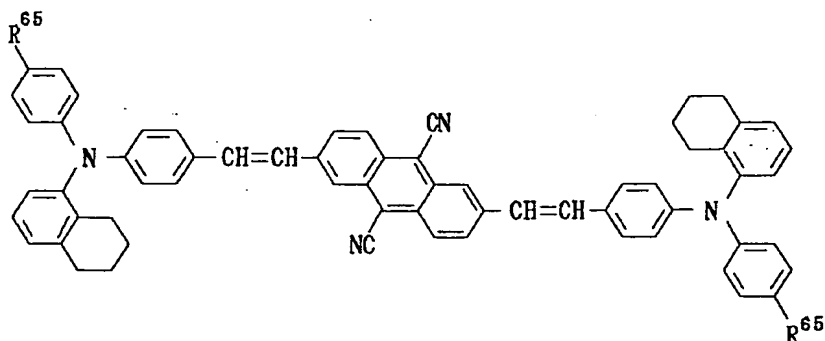
(where R^{64} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (17)



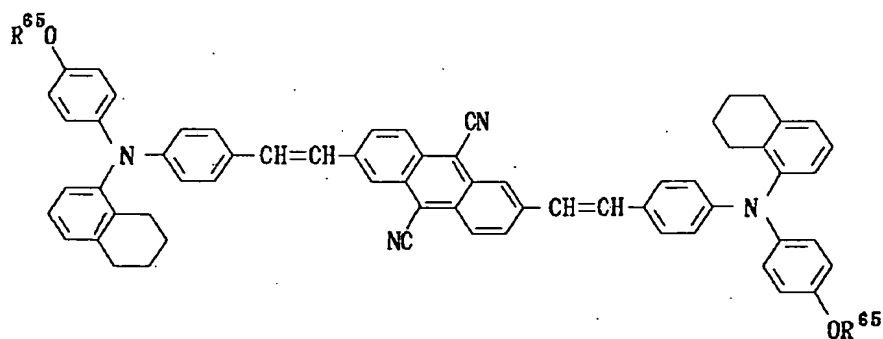
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (17')



(where R⁶⁵ denotes a hydrogen atom or a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (17'')

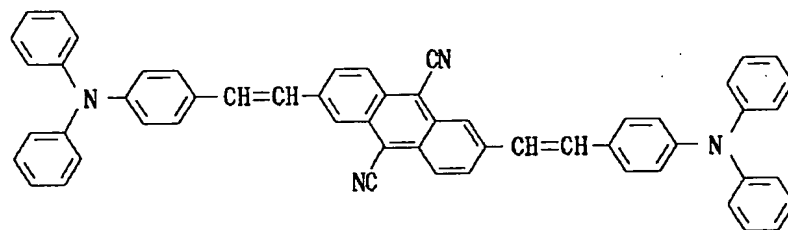


(where R⁶⁵ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

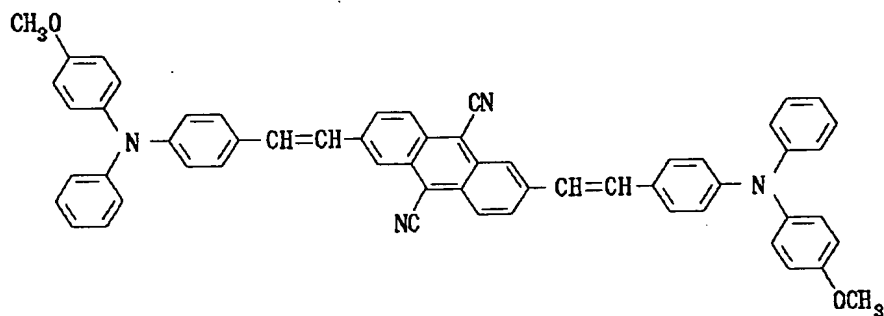
5. A bis(aminostyryl)anthracene compound as defined in Claim 1 or 2 which is represented by the structural formula (18)-1, (18)-2, (18)-2', (18)-3, (18)-

4, (18)-5, (18)-6, (18)-6', (18)-7, (18)-8, (18)-9, (18)-10, (18)-10', (18)-10'', or (18)-11 below.

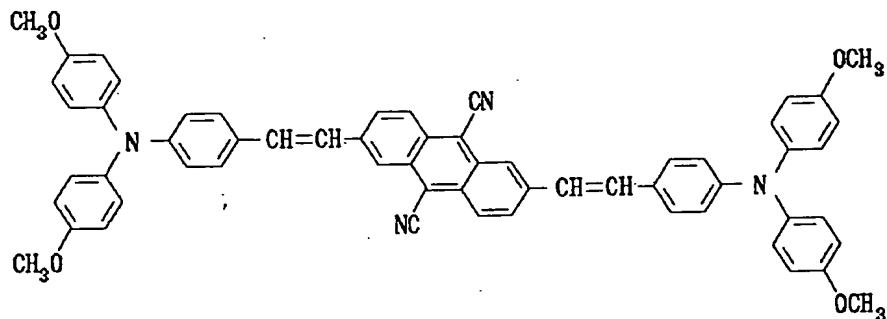
Structural formula (18)-1



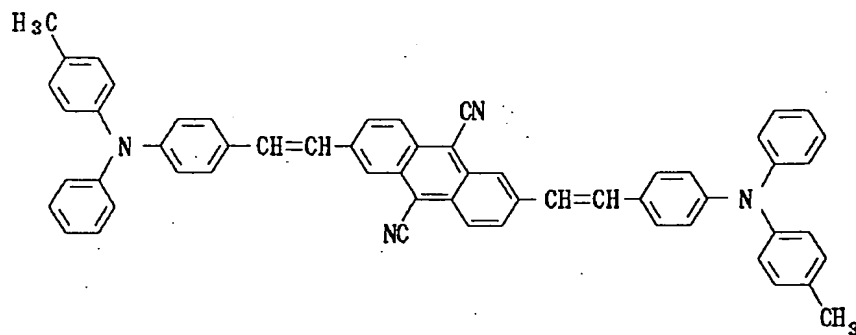
Structural formula (18)-2



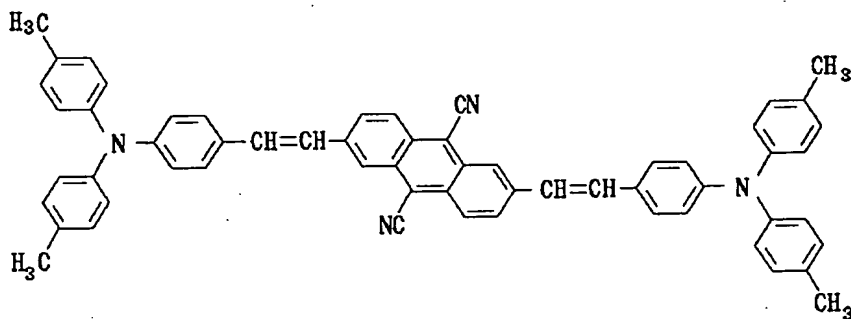
Structural formula (18)-2'



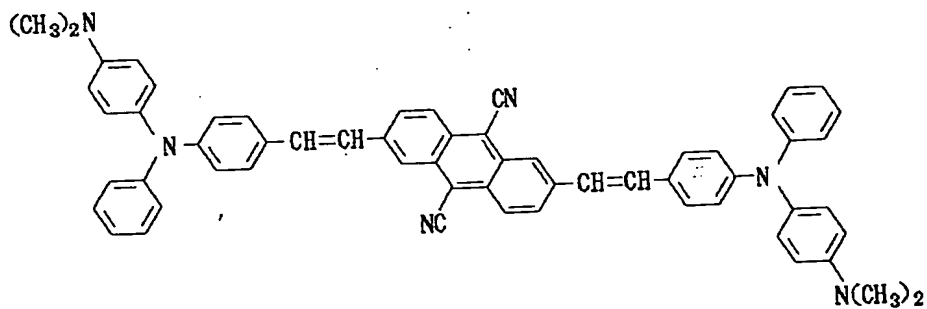
Structural formula (18) - 3



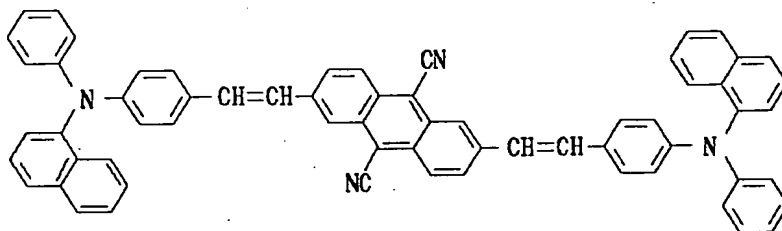
Structural formula (18) - 4



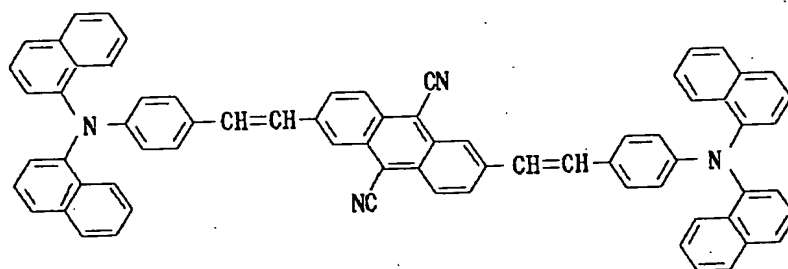
Structural formula (18) - 5



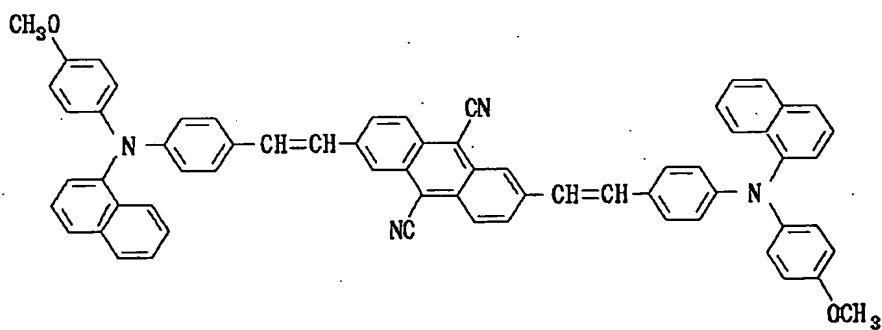
Structural formula (18) - 6



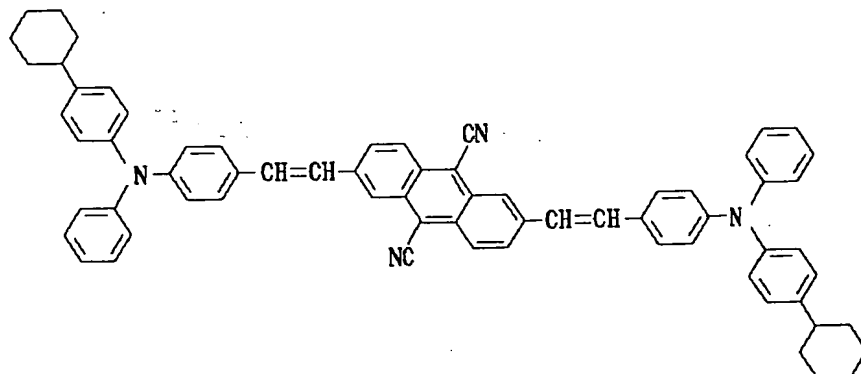
Structural formula (18) - 6'



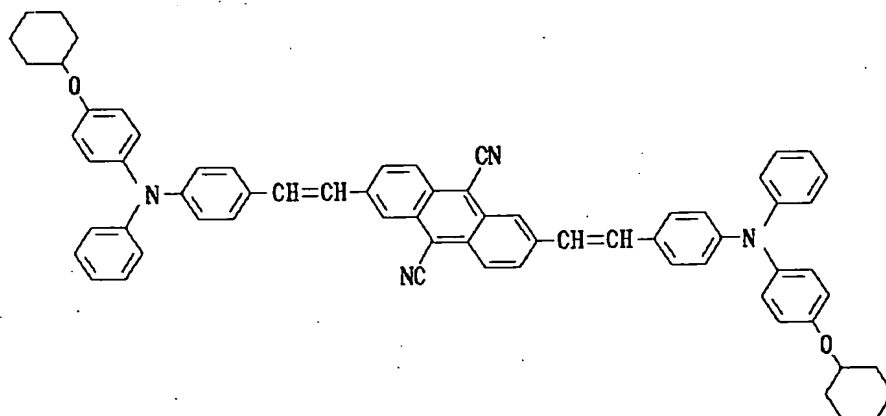
Structural formula (18) - 7



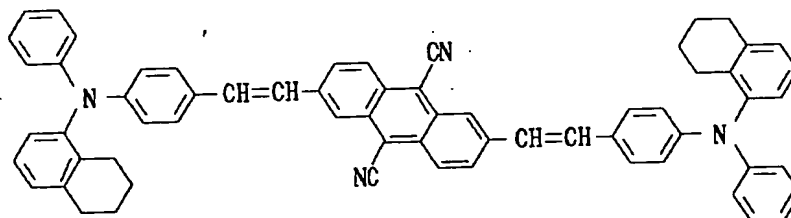
Structural formula (18)-8



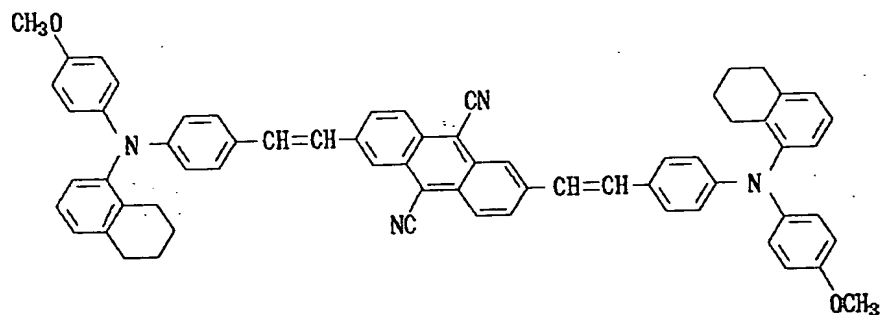
Structural formula (18)-9



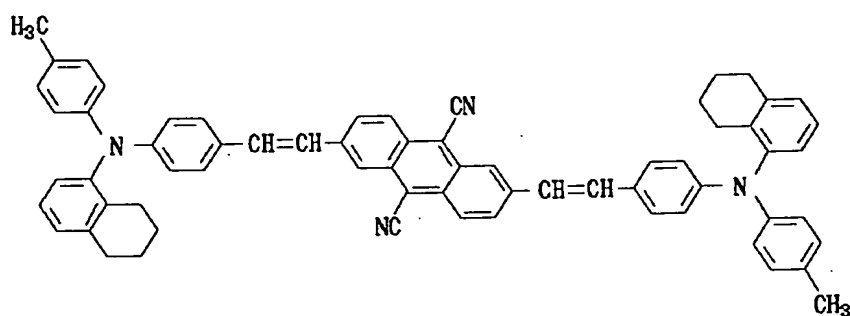
Structural formula (18)-10



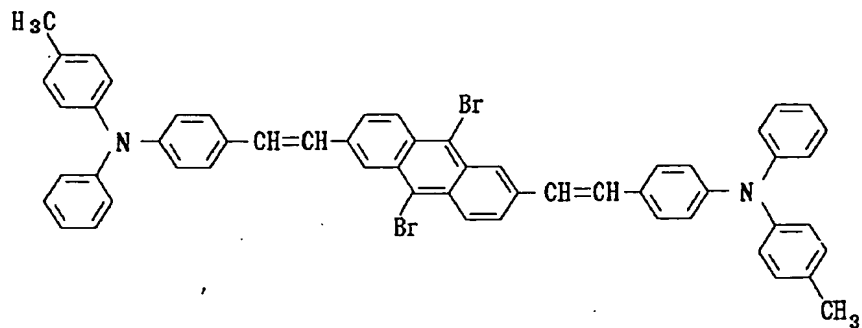
Structural formula (18)-10'



Structural formula (18)-10''



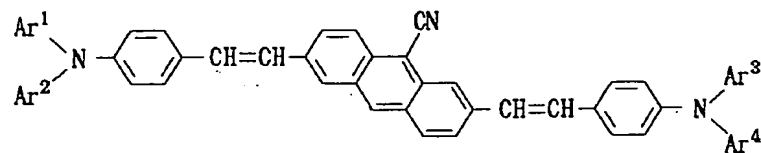
Structural formula (18)-11



6. A bis(aminostyryl)anthracene compound

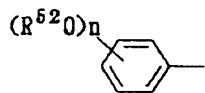
represented by the general formula (19) below.

General formula (19)

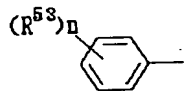


(where Ar¹, Ar², Ar³, and Ar⁴ are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8), (9), (10), (11), (12), (12'), or (12'') below.

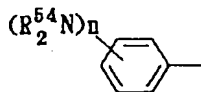
General formula (7)



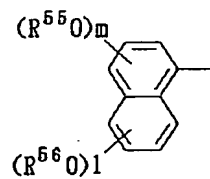
General formula (8)



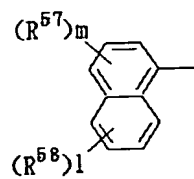
General formula (9)



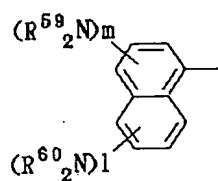
General formula (10)



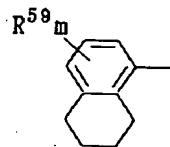
General formula (11)



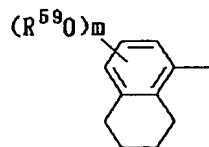
General formula (12)



General formula (12')



General formula (12'')

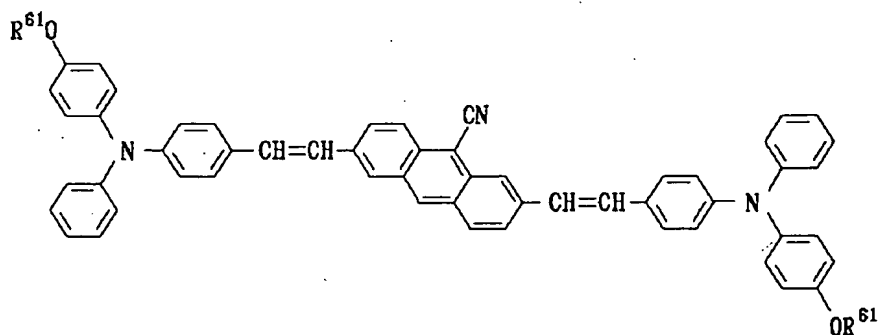


(where R^{52} , R^{53} , and R^{54} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} are identical or different, each denoting a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6; m is an integer of 0 to 3; and l is an integer of 0 to 4.)

7. A bis(aminostyryl)anthracene compound as defined in Claim 6, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has 1 to 6 carbon atoms.

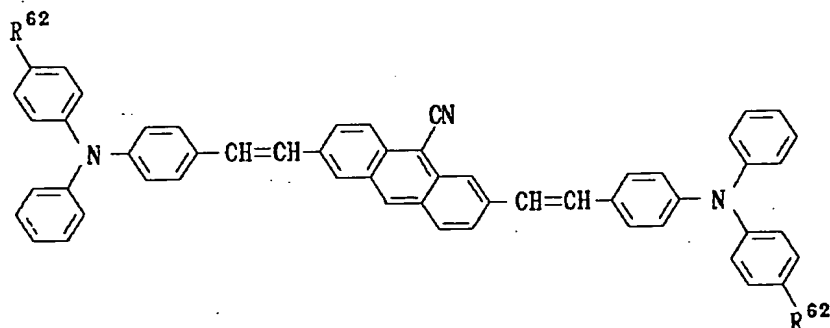
8. A bis(aminostyryl)anthracene compound as defined in Claim 1 or 6 which is represented by the general formula (20), (21), (22), (23), (24), (24') or (24'') below.

General formula (20)



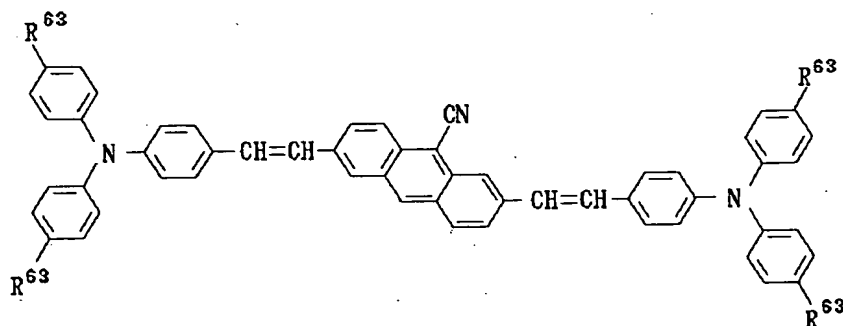
(where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (21)



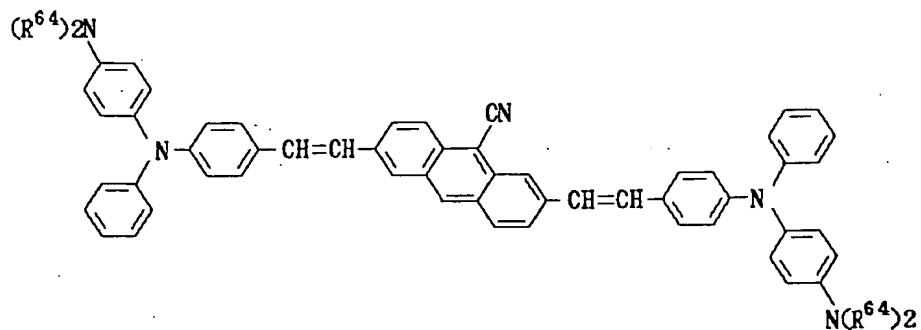
(where R⁶² denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (22)



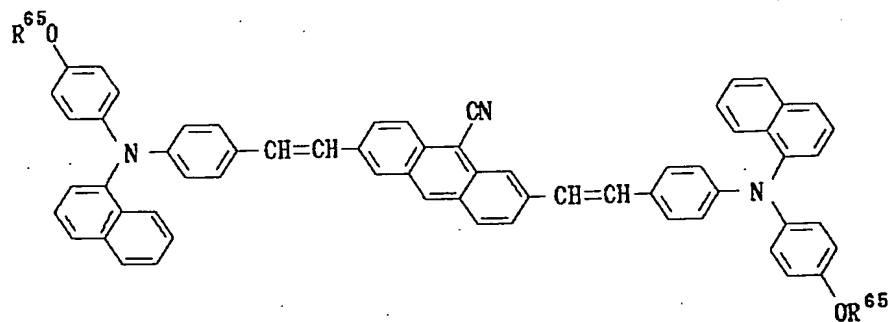
(where R⁶³ denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.)

General formula (23)



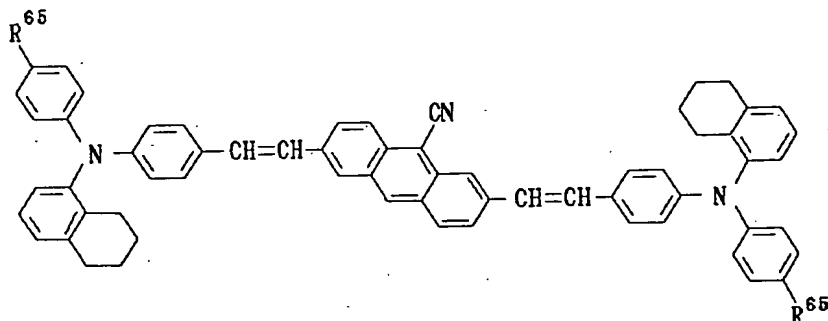
(where R^{64} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (24)



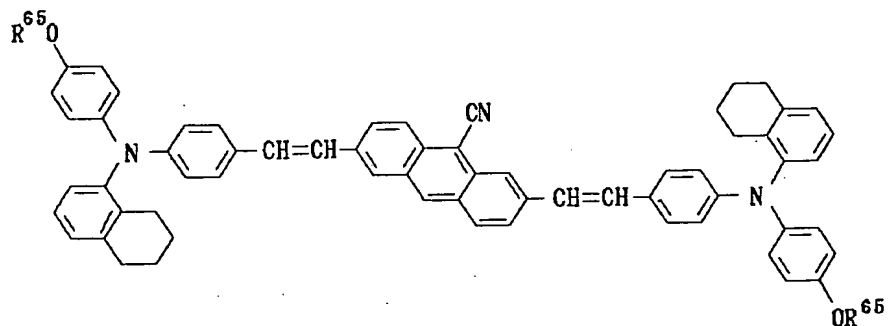
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (24')



(where R⁶⁵ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (24'')

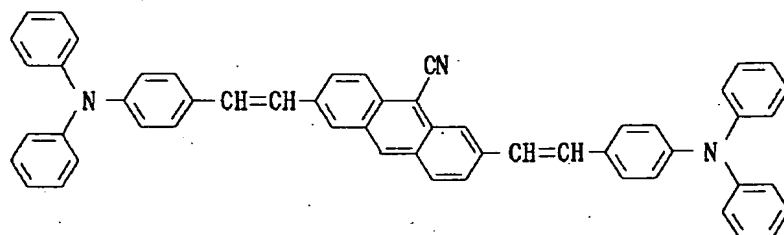


(where R⁶⁵ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

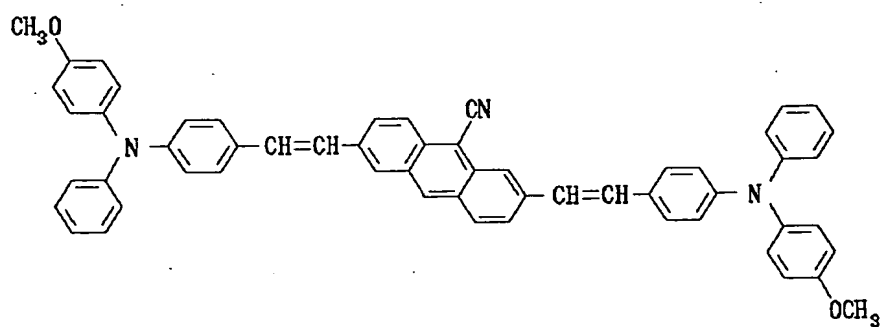
9. A bis(aminostyryl)anthracene compound as defined in Claim 1 or 6 which is represented by the structural formula (25)-1, (25)-2, (25)-2', (25)-3, (25)-4, (25)-5, (25)-6, (25)-6', (25)-7, (25)-8, (25)-9, (25)-

10, (25)-10', (25)-10'', or (25)-11 below.

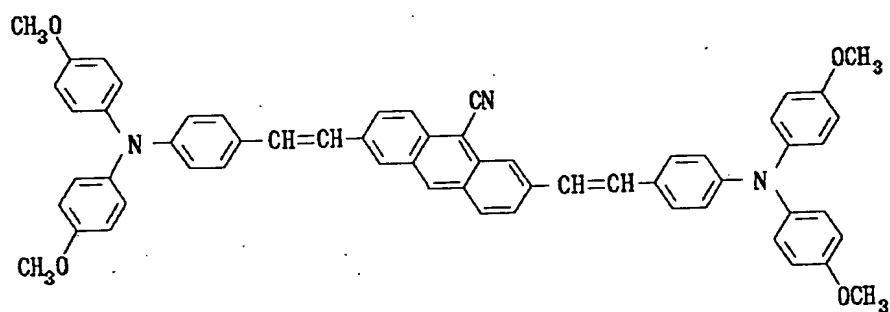
Structural formula (25)-1



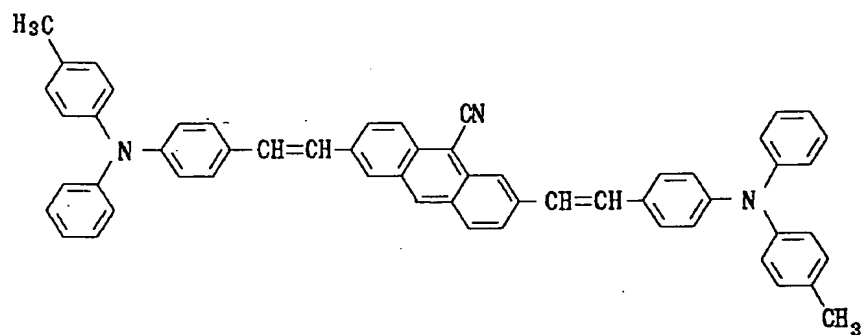
Structural formula (25)-2



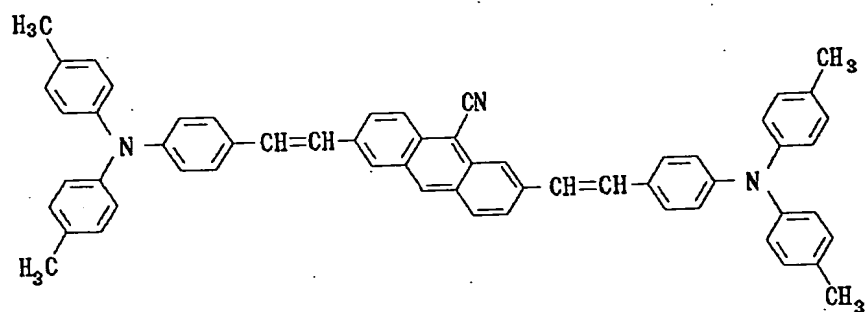
Structural formula (25)-2'



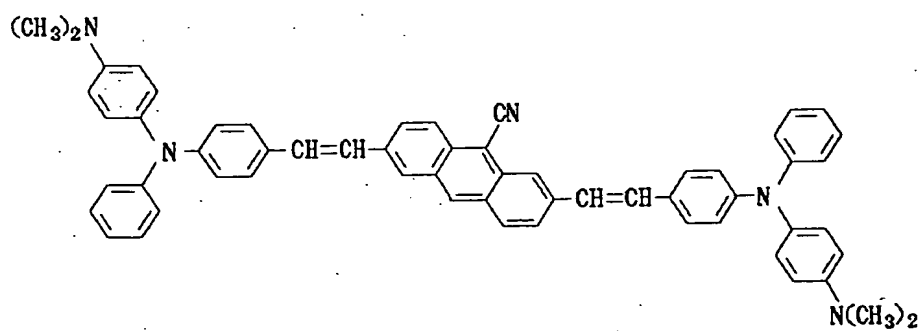
Structural formula (25) -3



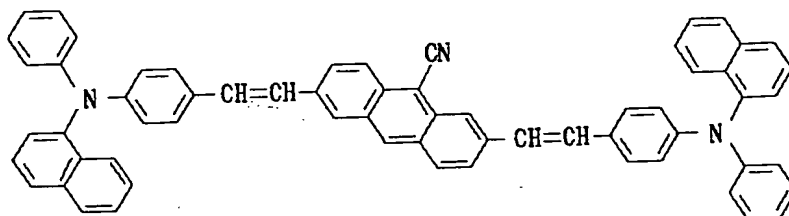
Structural formula (25) -4



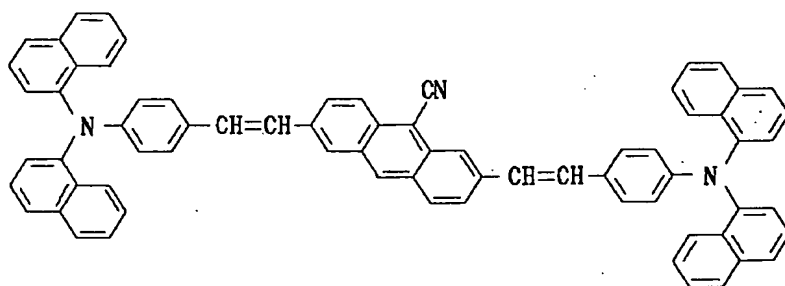
Structural formula (25) -5



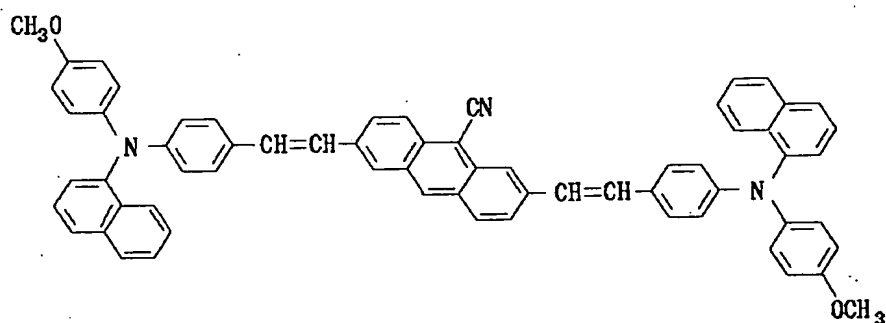
Structural formula (25) - 6



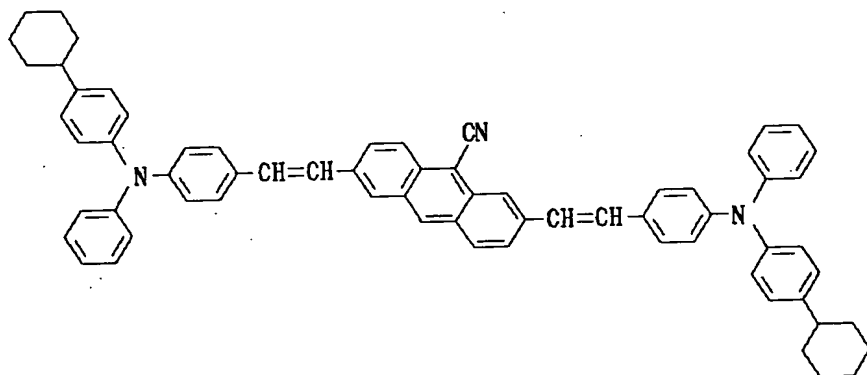
Structural formula (25) - 6'



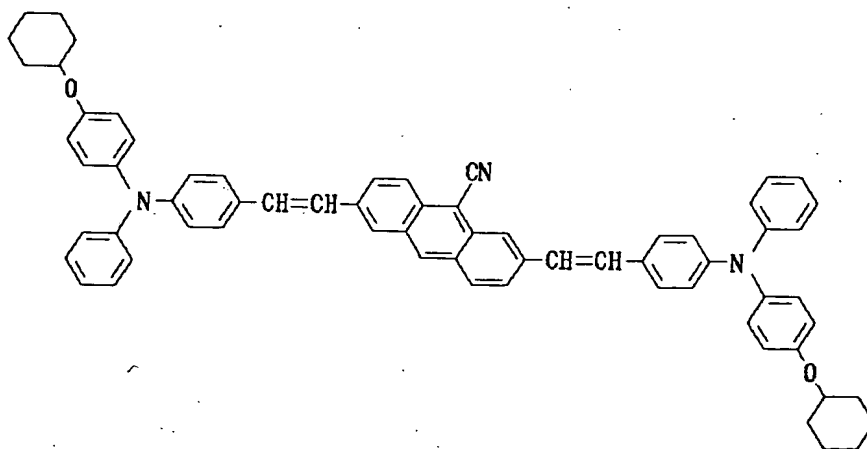
Structural formula (25) - 7



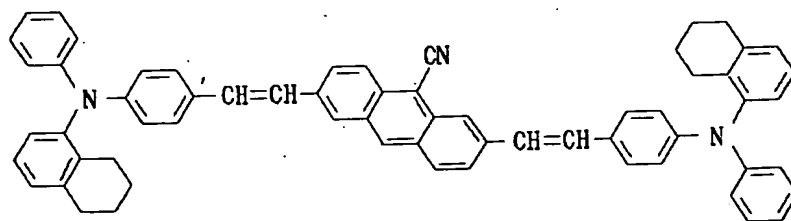
Structural formula (25) - 8



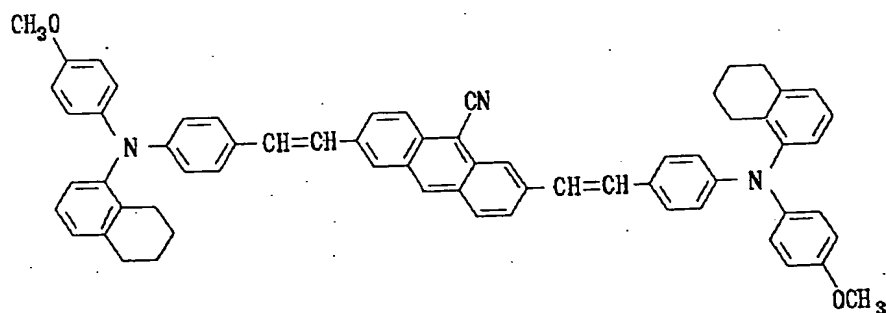
Structural formula (25) - 9



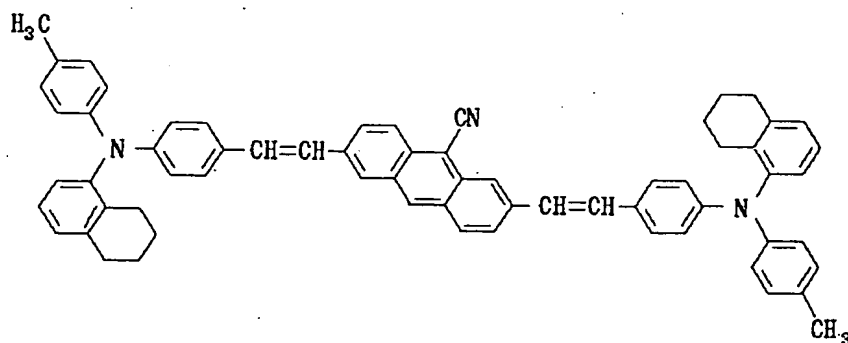
Structural formula (25) - 10



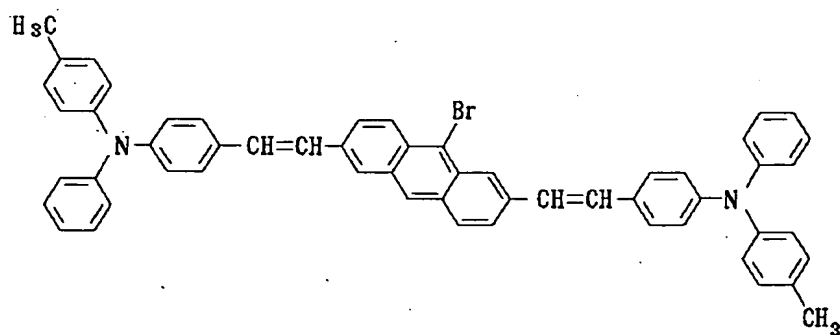
Structural formula (25)-10'



Structural formula (25)-10"

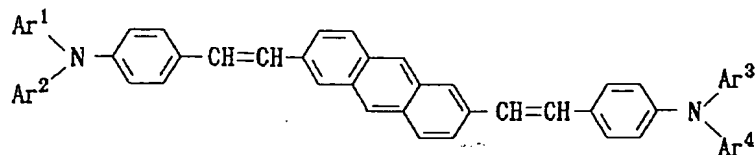


Structural formula (25)-11



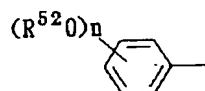
10. A bis(aminostyryl)anthracene compound which is represented by the general formula (26) below.

General formula (26)

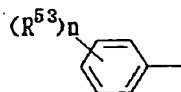


(where Ar¹, Ar², Ar³, and Ar⁴ are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8), (9), (10), (11), (12), (12'), or (12'') below.

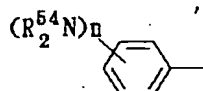
General formula (7)



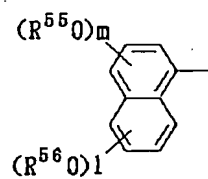
General formula (8)



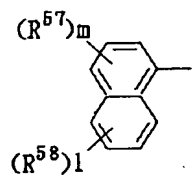
General formula (9)



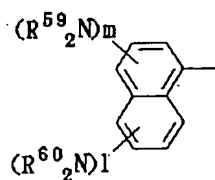
General formula (10)



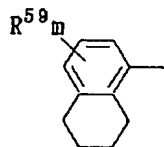
General formula (11)



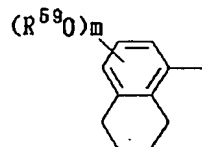
General formula (12)



General formula (12')



General formula (12'')

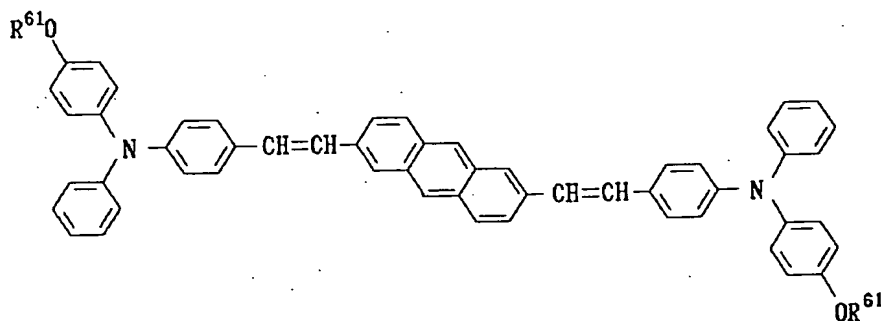


(where R^{52} , R^{53} , and R^{54} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} are identical or different, each denoting a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6; m is an integer of 0 to 3; and l is an integer of 0 to 4.)

11. A bis(aminostyryl)anthracene compound as defined in Claim 10, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has 1 to 6 carbon atoms.

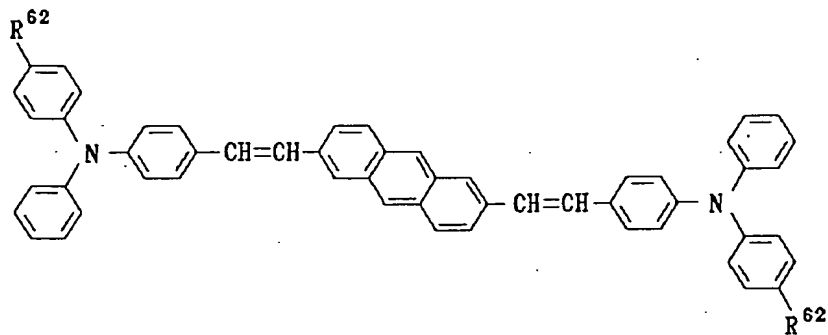
12. A bis(aminostyryl)anthracene compound as defined in Claim 1 or 10 which is represented by the general formula (27), (28), (29), (30), (31), (31') or (31'') below.

General formula (27)



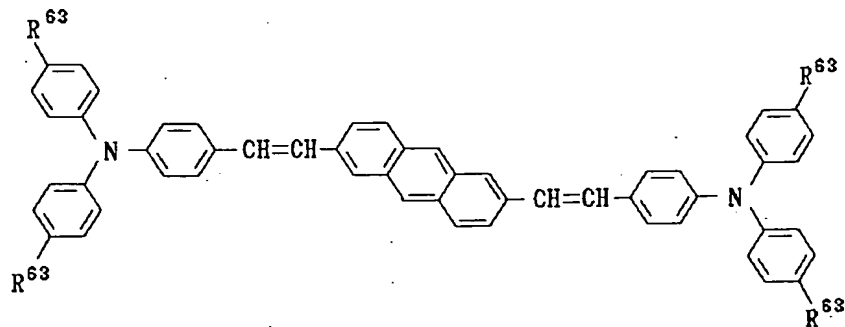
(where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (28)



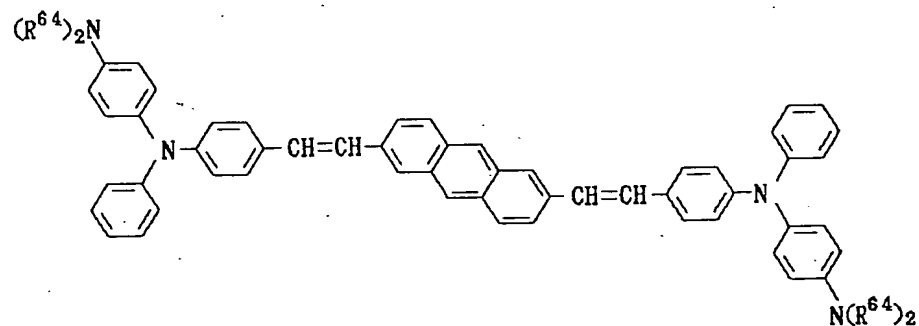
(where R⁶² denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (29)



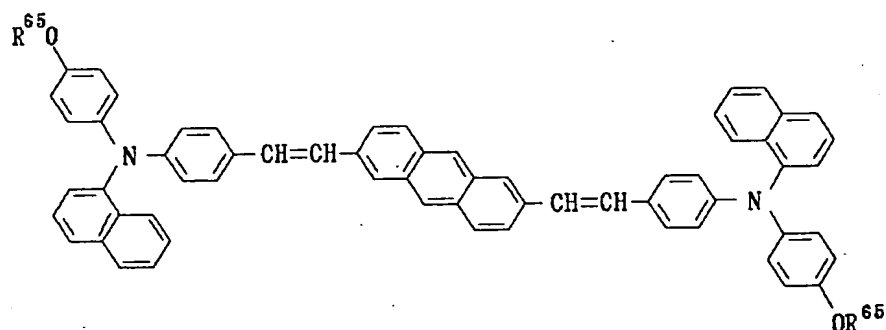
(where R⁶³ denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.)

General formula (30)



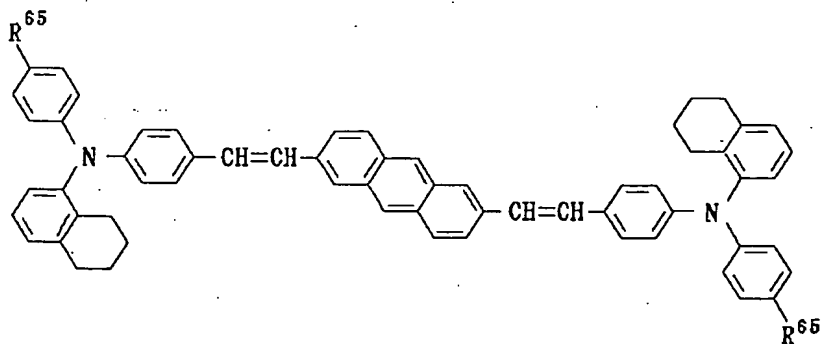
(where R⁶⁴ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (31)



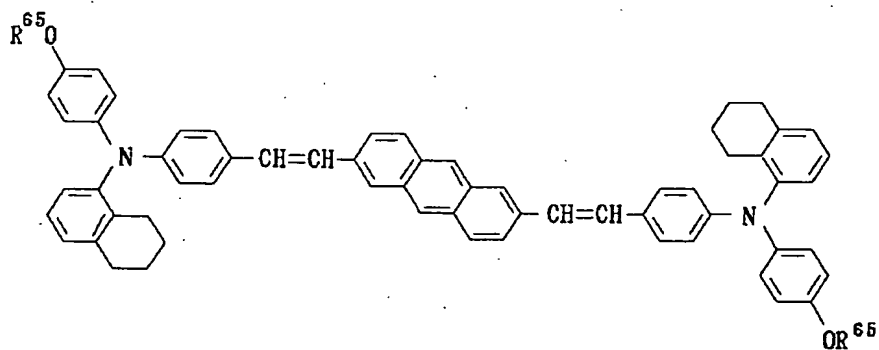
group having 1 to 6 carbon atoms.)

General formula (31')



(where R⁶⁵ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (31'')

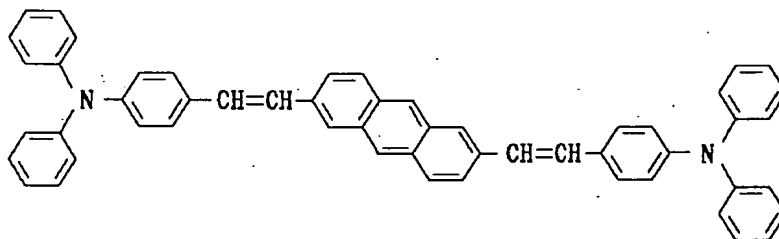


(where R⁶⁵ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

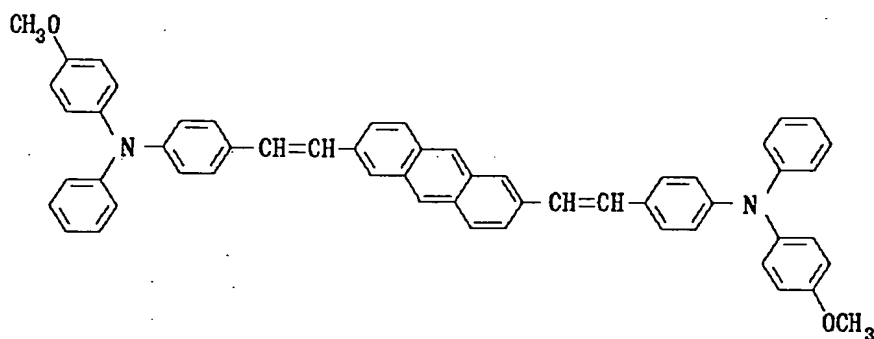
13. A bis(aminostyryl)anthracene compound as defined in Claim 1 or 10 which is represented by the structural formula (32)-1, (32)-2, (32)-2', (32)-3, (32)-4, (32)-5, (32)-6, (32)-6', (32)-7, (32)-8, (32)-9, (32)-

10, (32)-10', or (32)-10" below.

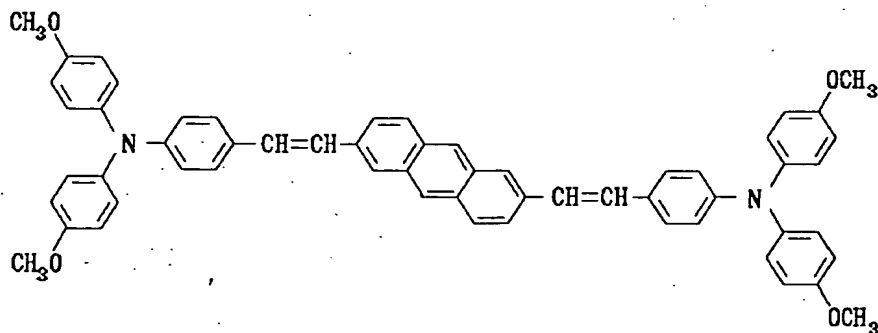
Structural formula (32)-1



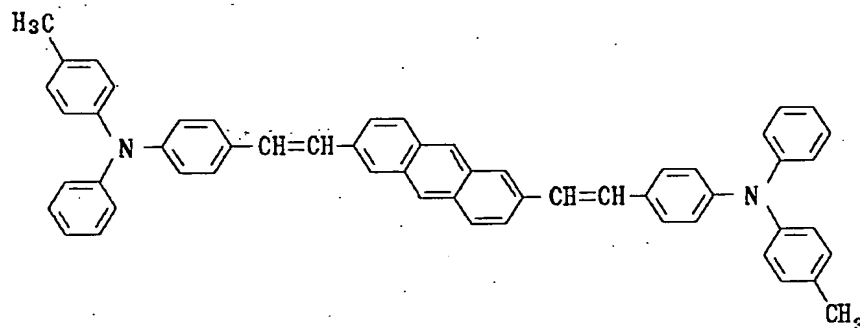
Structural formula (32)-2



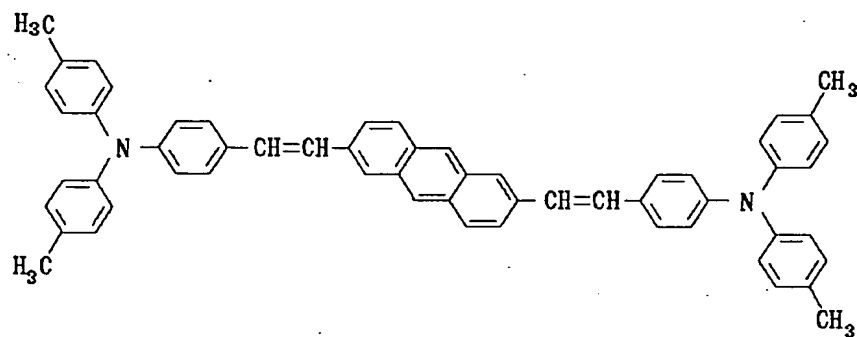
Structural formula (32)-2'



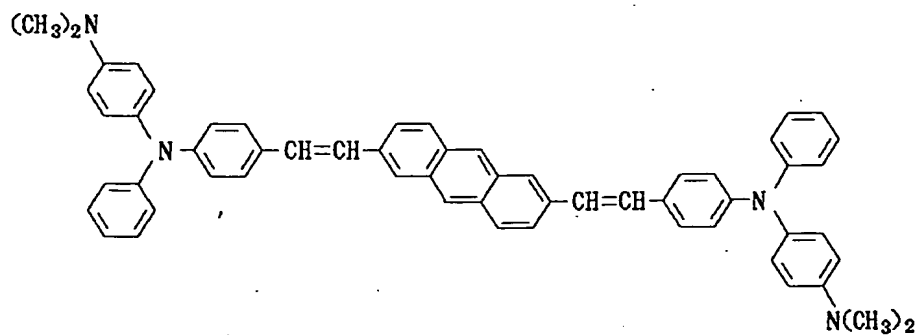
Structural formula (32) - 3



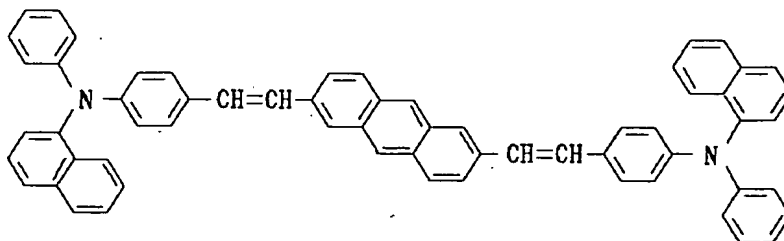
Structural formula (32) - 4



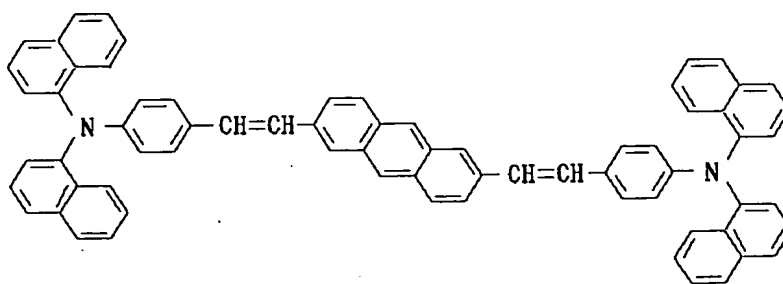
Structural formula (32) - 5



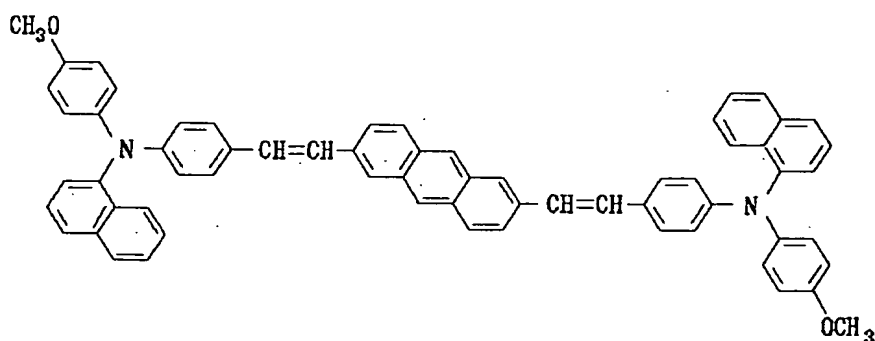
Structural formula (32) - 6



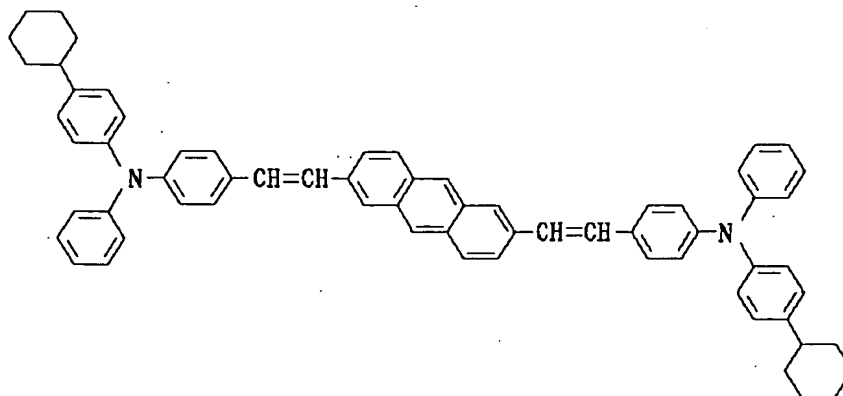
Structural formula (32) - 6'



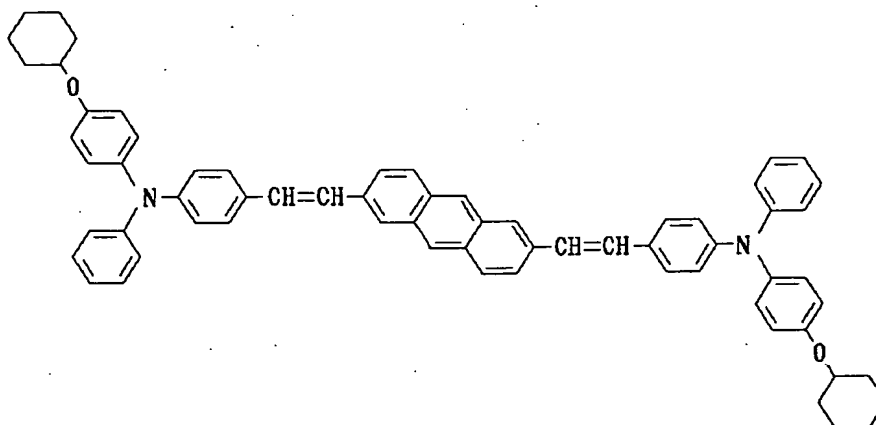
Structural formula (32) - 7



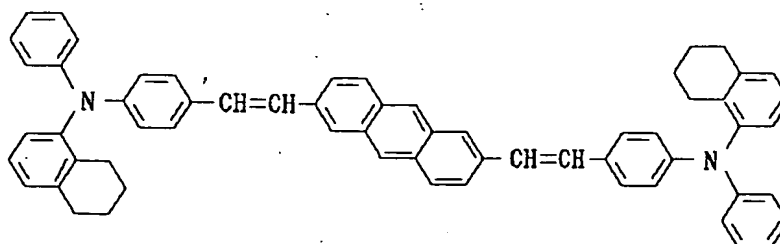
Structural formula (32) - 8



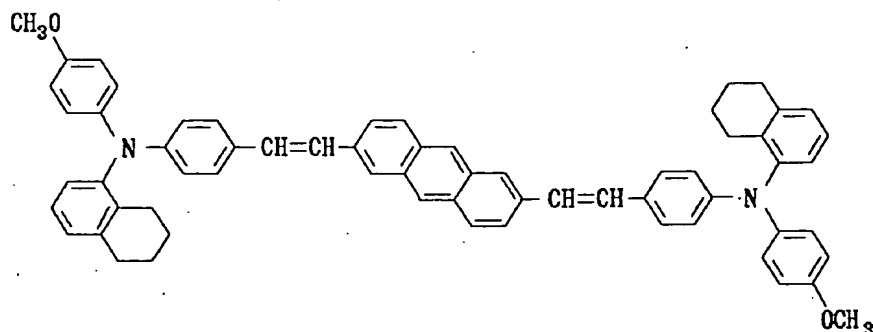
Structural formula (32) - 9



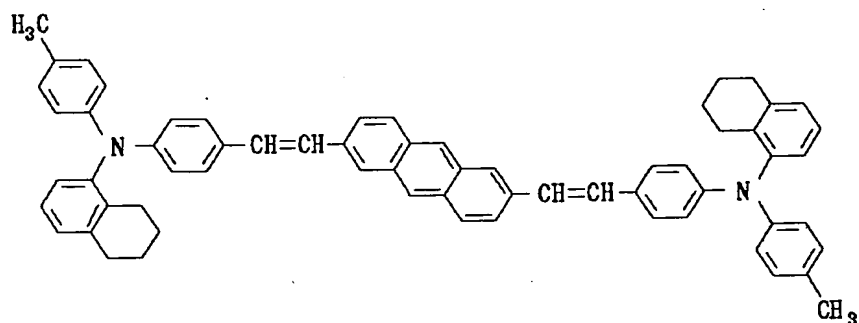
Structural formula (32) - 10



Structural formula (35)-10'



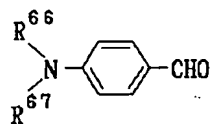
Structural formula (32)-10"



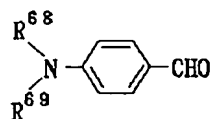
14. A process for producing a bis(aminostyryl) anthracene compound represented by the general formula [I], [II], [III], or [IV] below, said process comprising condensing at least one species of 4-(N,N-diarylamino)benzaldehyde represented by the general formula [V] or [VI] below and diphosphonic ester represented by the general formula [VII] below or diphosphonium represented by the general formula [VIII]

below.

General formula [V]

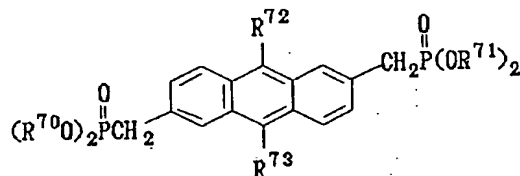


General formula [VI]

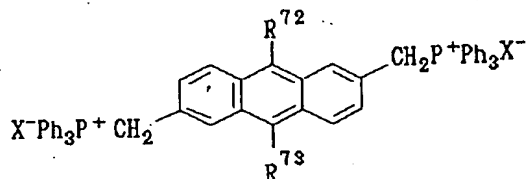


(where R^{66} and R^{67} each denotes an aryl group corresponding to R^1 , R^2 , R^{12} , R^{13} , R^{23} , R^{24} , R^{34} , or R^{35} given below; and R^{68} and R^{69} each denotes an aryl group corresponding to R^3 , R^4 , R^{14} , R^{15} , R^{25} , R^{26} , R^{36} , or R^{37} given below.)

General formula [VII]



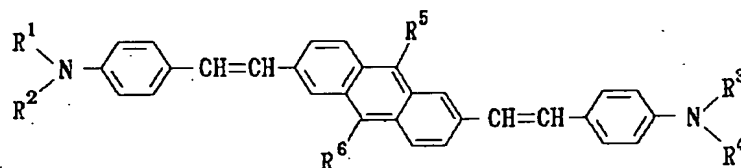
General formula [VIII]



(where R^{70} and R^{71} are identical or different, each

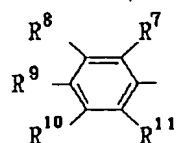
denoting a hydrocarbon group; R^{72} and R^{73} each denotes a group corresponding to R^5 , R^6 , R^{16} , R^{17} , R^{27} , R^{28} , R^{38} , or R^{39} given below; and X denotes a halogen atom.)

General formula [I]



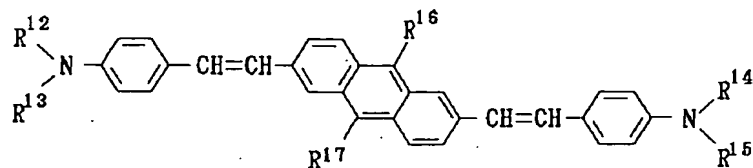
(where R^2 and R^3 each denotes an unsubstituted aryl group, and R^1 and R^4 each denotes an aryl group represented by the general formula (1) below.)

General formula (1)



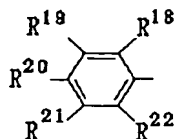
(where R^7 , R^8 , R^9 , R^{10} , and R^{11} are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having one or more carbons; and R^5 and R^6 are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [II]



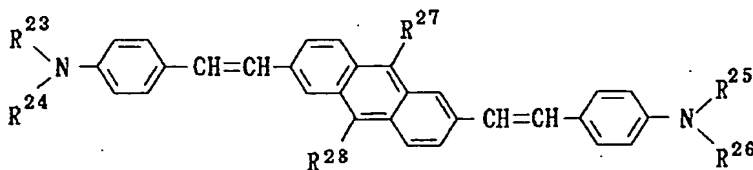
(where R¹², R¹³, R¹⁴, and R¹⁵ are identical or different groups, each denoting an aryl group represented by the general formula (2) below.)

General formula (2)



(where R¹⁸, R¹⁹, R²⁰, R²¹, and R²² are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having one or more carbons; and R¹⁶ and R¹⁷ are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

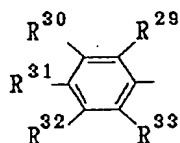
General formula [III]



005007 14003500

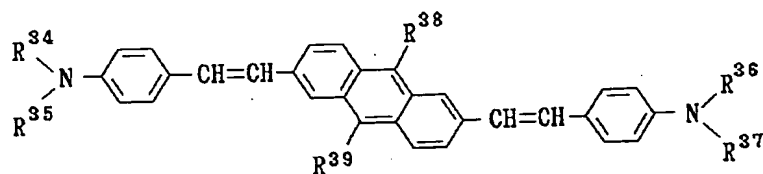
(where at least one of R^{23} , R^{24} , R^{25} , and R^{26} denotes an aryl group represented by the general formula (3) below, with the remainder being an unsubstituted aryl group.)

General formula (3)



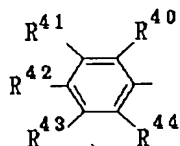
(where R^{29} , R^{30} , R^{31} , R^{32} , and R^{33} are identical or different groups, at least one of them being a saturated or unsaturated hydrocarbon amino group; and R^{27} and R^{28} are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [IV]



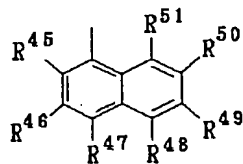
(where R^{35} and R^{36} are identical or different groups, each denoting an aryl group represented by the general formula (4) below.)

General formula (4)



(where R⁴⁰, R⁴¹, R⁴², R⁴³, and R⁴⁴ are identical or different groups, each denoting hydrogen or at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group having one or more carbons; and R³⁴ and R³⁷ are identical or different groups, being an aryl group represented by the general formula (5) below.)

General formula (5)

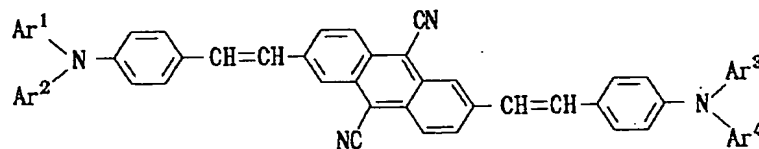


(where R⁴⁵, R⁴⁶, R⁴⁷, R⁴⁸, R⁴⁹, R⁵⁰, and R⁵¹ are identical or different groups, each denoting a hydrogen atom or at least one of them being a saturated or unsaturated hydrocarbon oxy group or hydrocarbon group, or hydrocarbon amino group having one or more carbons; and R³⁸ and R³⁹ are identical or different groups, at least one of them being a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

15. A process for producing a bis(aminostyryl) anthracene compound as defined in Claim 14, wherein said condensation is accomplished by Wittig-Horner reaction or Wittig reaction, which involves treating the diphosphonic ester and/or diphosponium with a base in a solvent, thereby giving carboanion, and condensing this carboanion with the 4-(N,N-diarylamino)benzaldehyde.

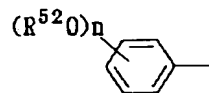
16. A process for producing a bis(aminostyryl) anthracene compound as defined in Claim 14, wherein said bis(aminostyryl) anthracene is represented by the general formula (6) below.

General formula (6)

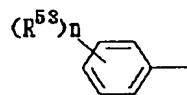


(where Ar¹, Ar², Ar³, and Ar⁴ are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8), (9), (10), (11), (12), (12'), or (12'') below.

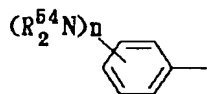
General formula (7)



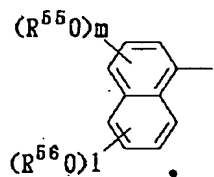
General formula (8)



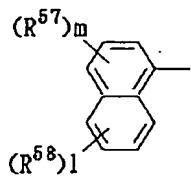
General formula (9)



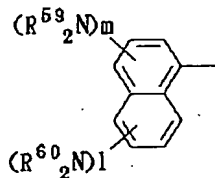
General formula (10)



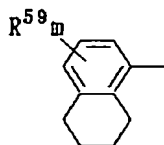
General formula (11)



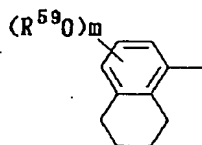
General formula (12)



General formula (12')



General formula (12'')

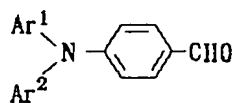


(where R^{52} , R^{53} , and R^{54} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} are identical or different, each denoting a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6; m is an integer of 0 to 3; and l is an integer of 0 to 4.)

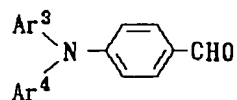
said process comprising condensing at least one species of 4-(N,N-diarylamino)benzaldehyde represented by the

general formula (33) or (34) below with diphosphonic ester represented by the general formula (35) below or diphosphonium represented by the general formula (36) below.

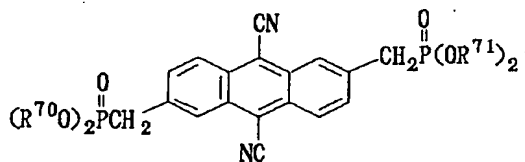
General formula (33)



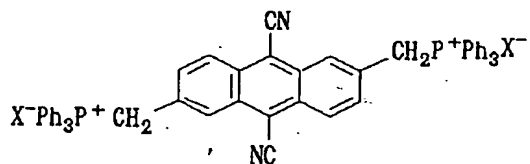
General formula (34)



General formula (35)



General formula (36)



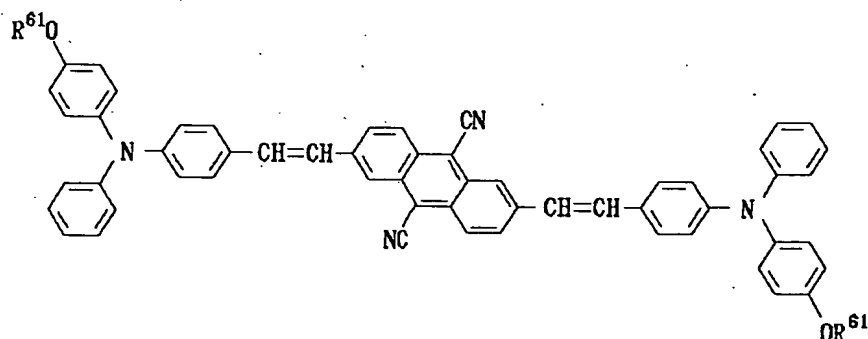
(where Ar^1 , Ar^2 , Ar^3 , Ar^4 , R^{70} , R^{71} and X are defined as above.)

17. A process for producing a bis(aminostyryl) anthracene compound as defined in Claim 16, wherein R^{70} and R^{71} each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

18. A process for producing a bis(aminostyryl) anthracene compound as defined in Claim 16, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has 0 to 6 carbon atoms.

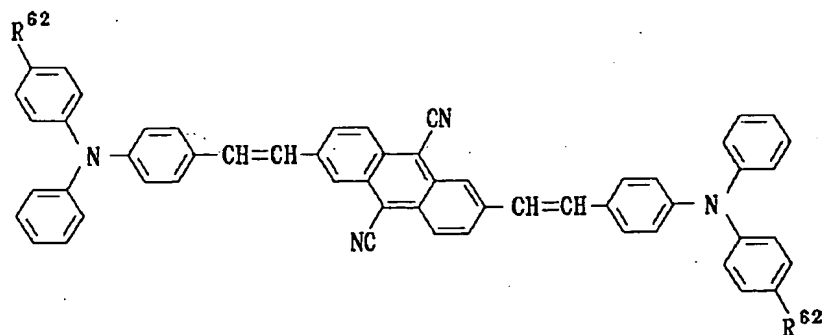
19. A process for producing a bis(aminostyryl) anthracene compound as defined in Claim 14 or 16, wherein said process yields a bis(aminostyryl)anthracene compound represented by the general formula (13), (14), (15), (16), (17), (17'), or (17'') below.

General formula (13)



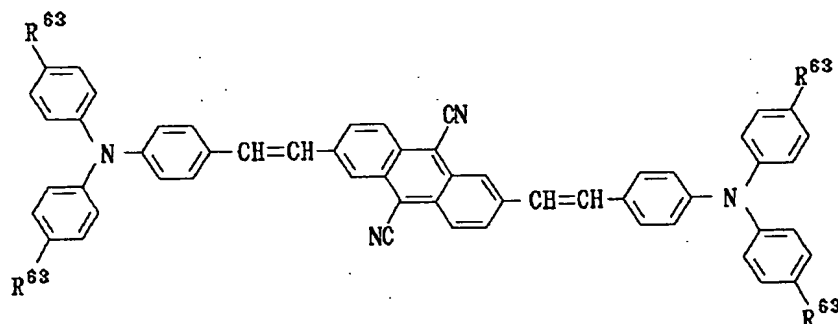
(where R^{61} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (14)



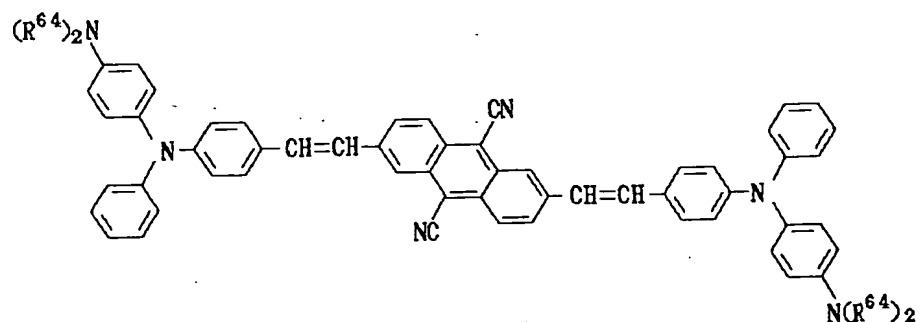
(where R^{62} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (15)



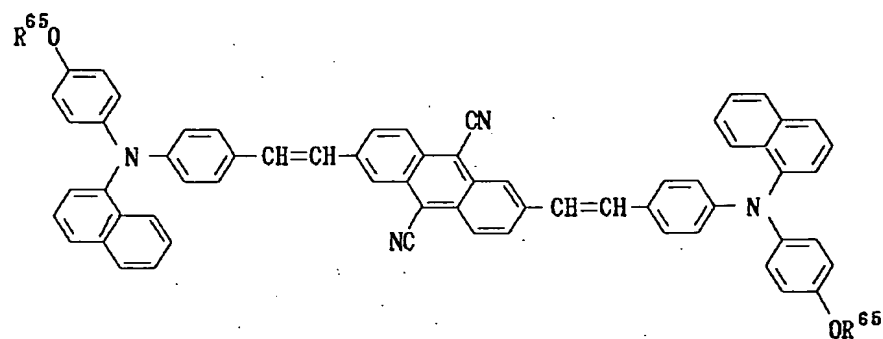
(where R^{63} denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.)

General formula (16)



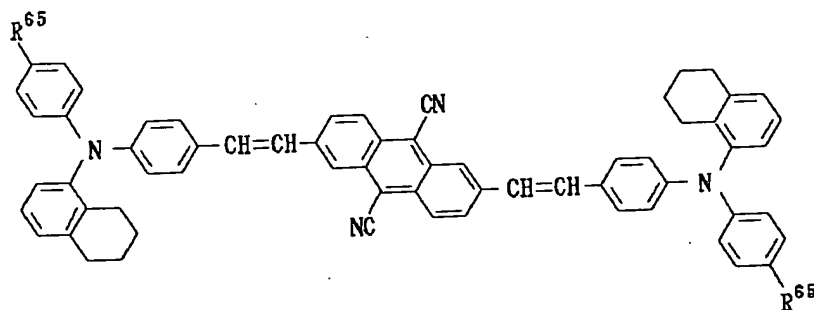
(where R^{64} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (17)



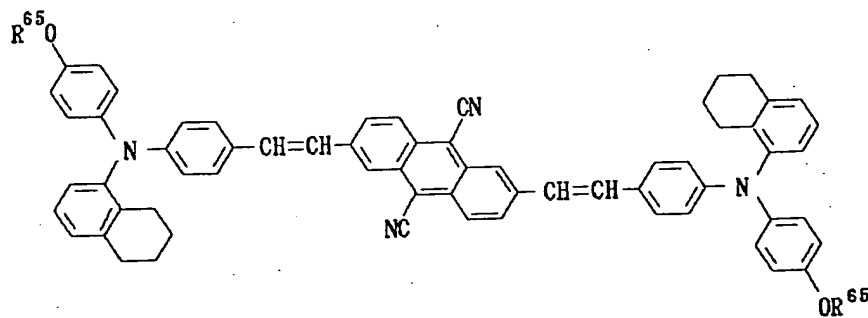
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (17')



(where R⁶⁵ denotes a hydrogen atom or a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (17'')



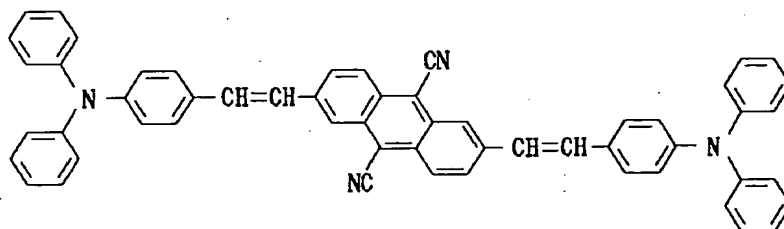
(where R⁶⁵ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

20. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 14, or 16, wherein said process yields a bis(aminostyryl)anthracene compound

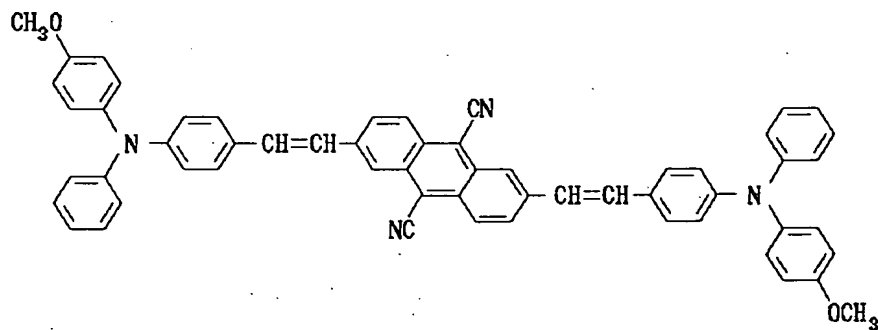
005007-1-00500

represented by the structural formula (18)-1, (18)-2, (18)-2', (18)-3, (18)-4, (18)-5, (18)-6, (18)-6', (18)-7, (18)-8, (18)-9, (18)-10, (18)-10', (18)-10'', or (18)-11 below.

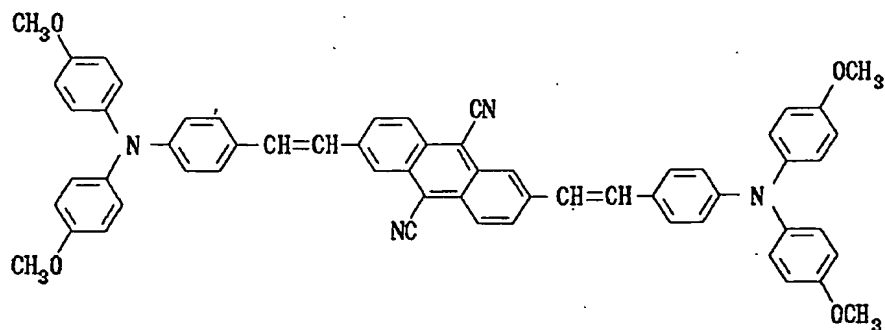
Structural formula (18)-1



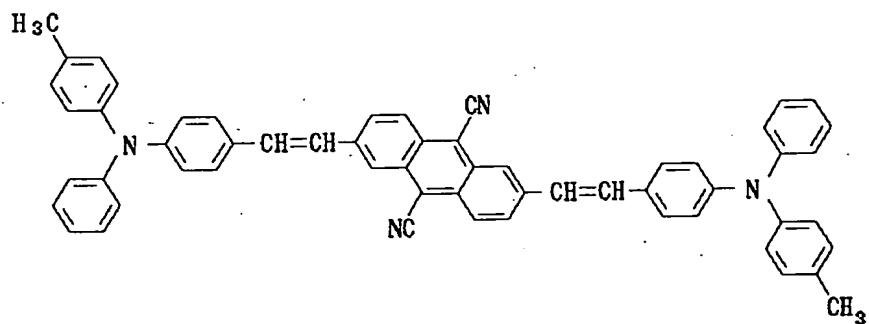
Structural formula (18)-2



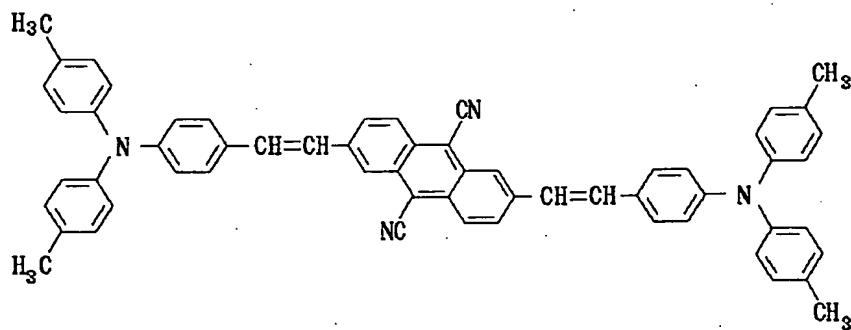
Structural formula (18)-2'



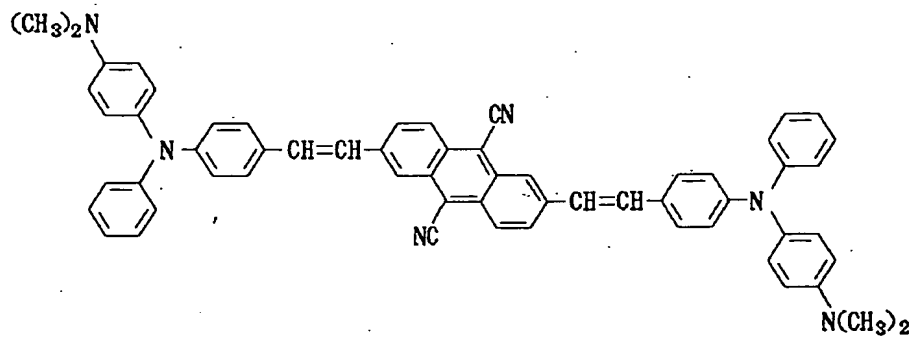
Structural formula (18) - 3



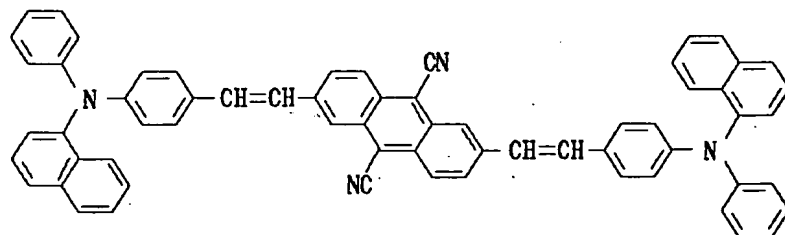
Structural formula (18) - 4



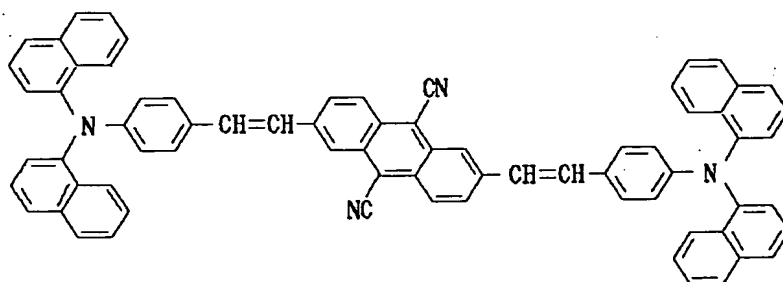
Structural formula (18) - 5



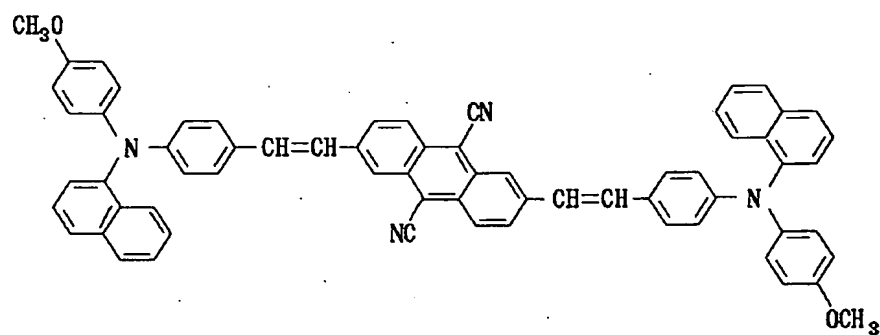
Structural formula (18) - 6



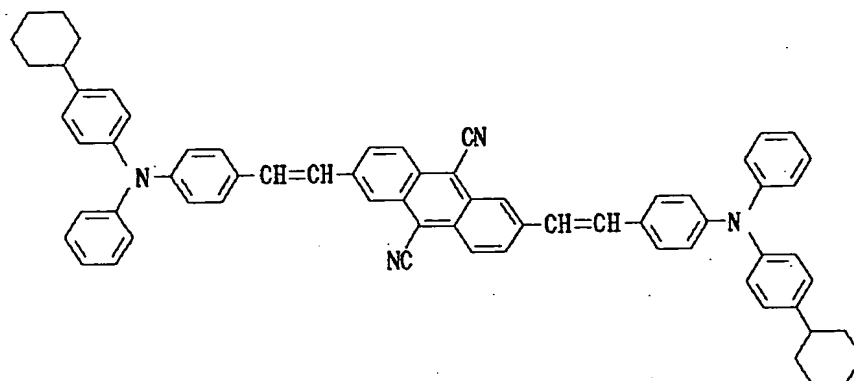
Structural formula (18) - 6'



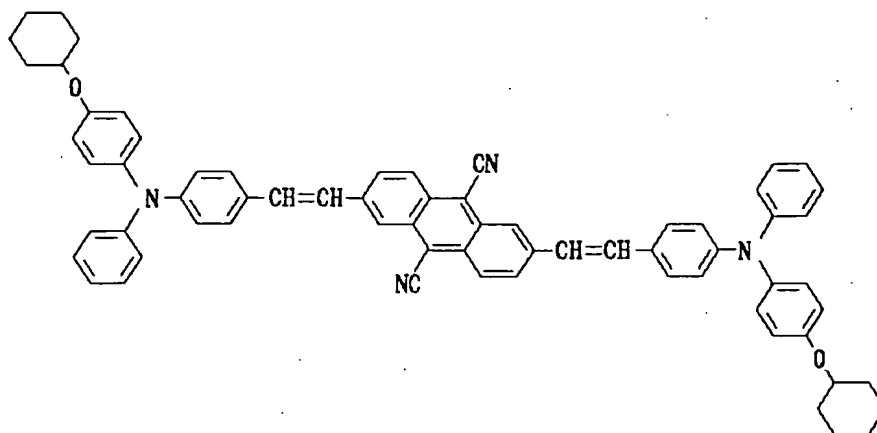
Structural formula (18) - 7



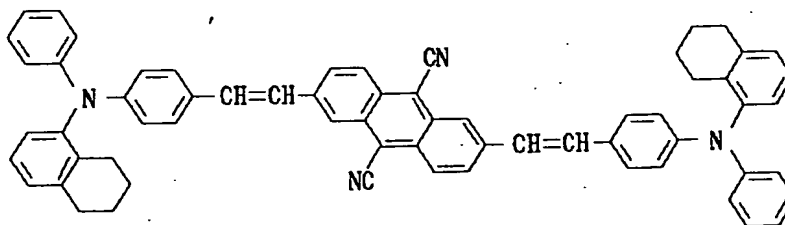
Structural formula (18) - 8



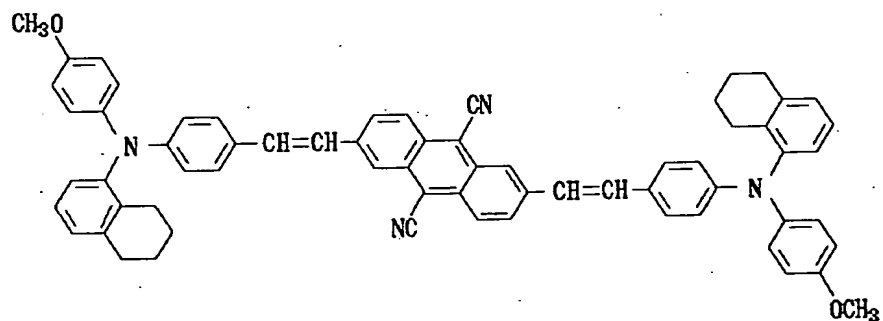
Structural formula (18) - 9



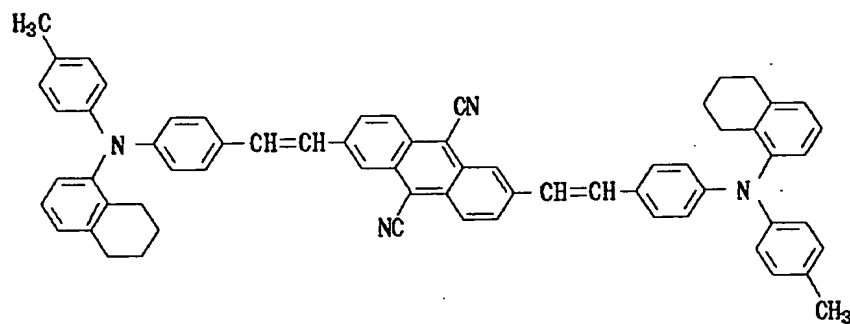
Structural formula (18) - 10



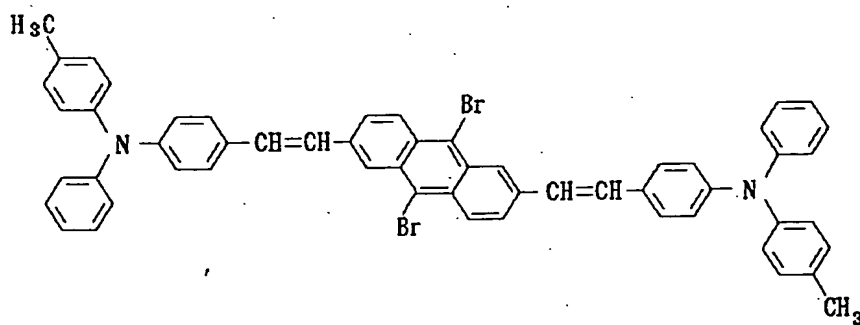
Structural formula (18)-10'



Structural formula (18)-10"



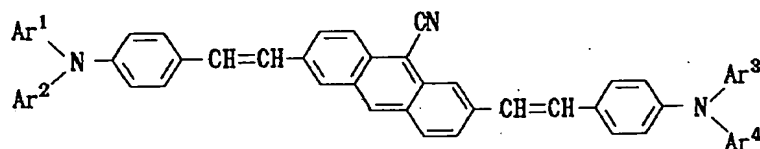
Structural formula (18)-11



21. A process for producing a

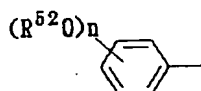
bis(aminostyryl)anthracene compound as defined in Claim 14, wherein said bis(aminostyryl)anthracene is represented by the general formula (19) below.

General formula (19)

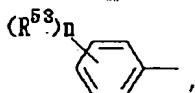


(where Ar¹, Ar², Ar³, and Ar⁴ are identical or different, each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8), (9), (10), (11), (12), (12'), or (12'') below.

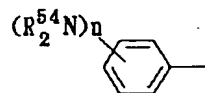
General formula (7)



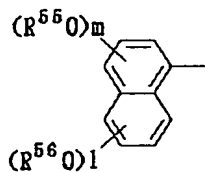
General formula (8)



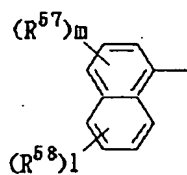
General formula (9)



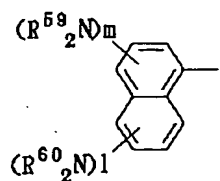
General formula (10)



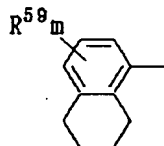
General formula (11)



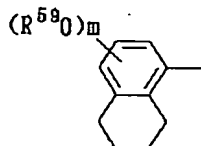
General formula (12)



General formula (12')



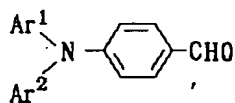
General formula (12")



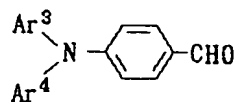
(where R^{52} , R^{53} , and R^{54} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} are identical or different, each denoting a saturated or unsaturated hydrocarbon group having one or more carbons; n is an integer of 0 to 6; m is an integer of 0 to 3; and l is an integer of 0 to 4.)

said process comprising condensing at least one species of 4-(N,N-diarylamino)benzaldehyde represented by the general formula (33) or (34) below with diphosphonic ester represented by the general formula (37) below or diphosponium represented by the general formula (38) below.

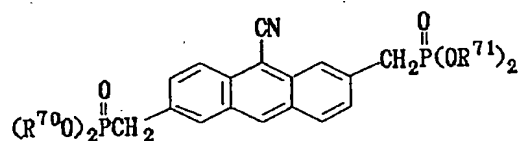
General formula (33)



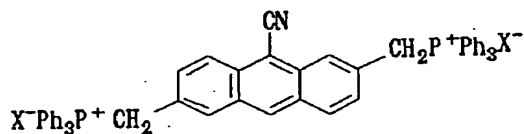
General formula (34)



General formula (37)



General formula (38)



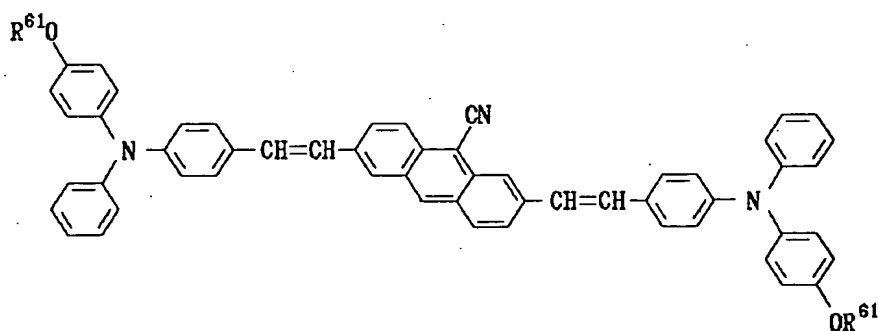
(where Ar¹, Ar², Ar³, Ar⁴, R⁷⁰, R⁷¹ and X are defined as above.)

22. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 21, wherein R⁷⁰ and R⁷¹ each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

23. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 21, wherein R⁵², R⁵³, R⁵⁴, R⁵⁵, R⁵⁶, R⁵⁷, R⁵⁸, R⁵⁹, and R⁶⁰ each has 0 to 6 carbon atoms.

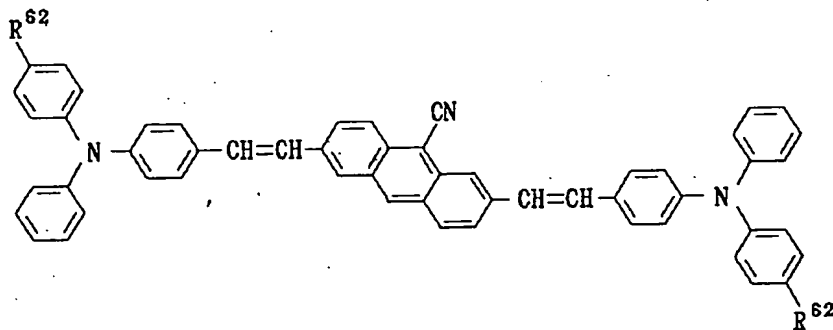
24. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 14 or 21, said process yielding a bis(aminostyryl)anthracene compound represented by the general formula (20), (21), (22), (23), (24), (24') or (24'') below.

General formula (20)



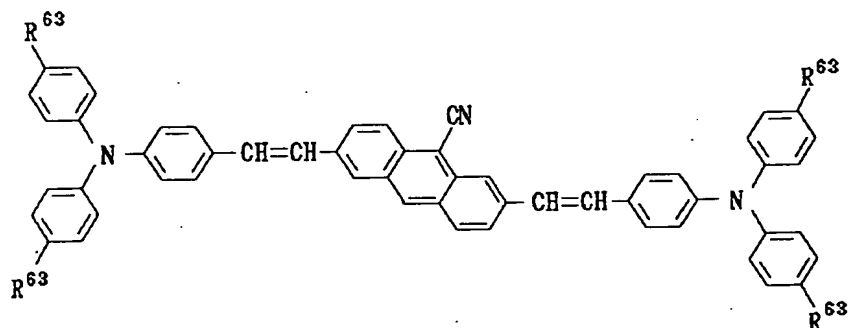
(where R⁶¹ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (21)



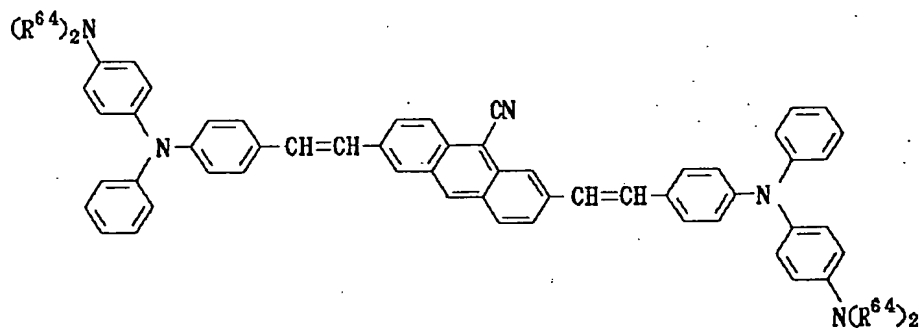
(where R^{62} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (22)



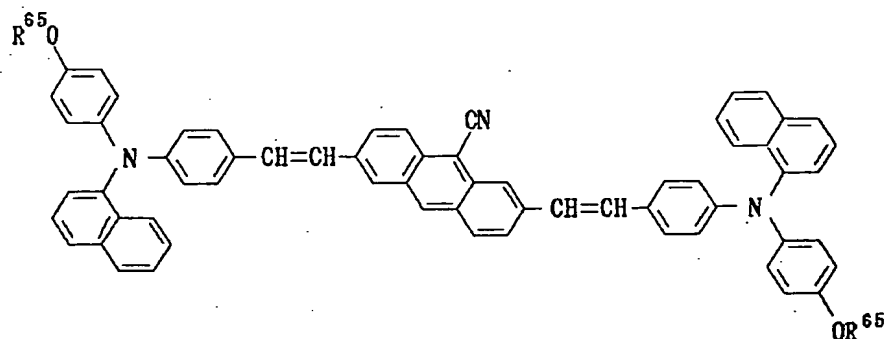
(where R^{63} denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.)

General formula (23)



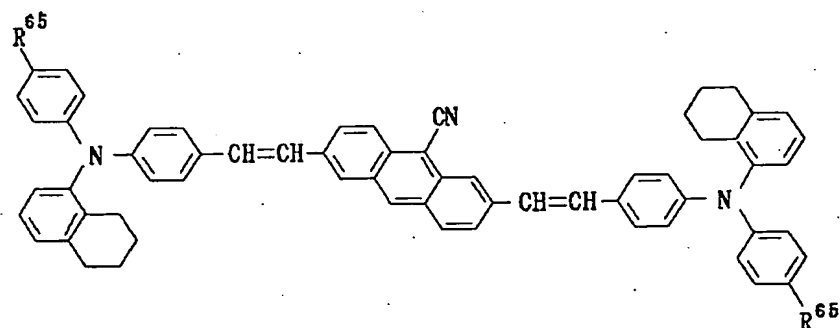
(where R^{64} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (24)



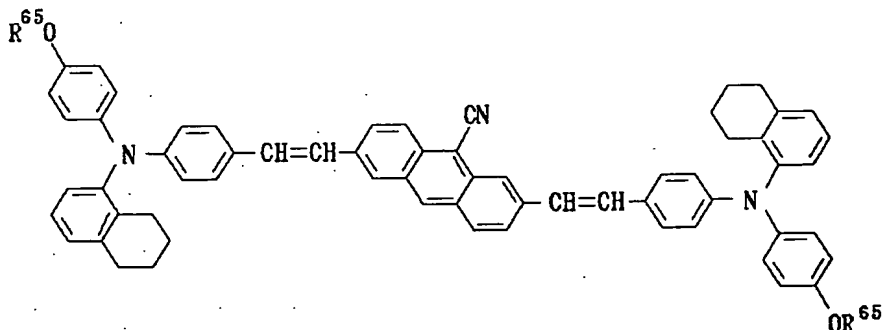
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (24')



(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

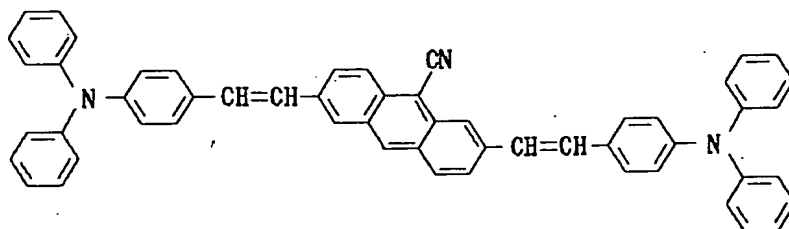
General formula (24")



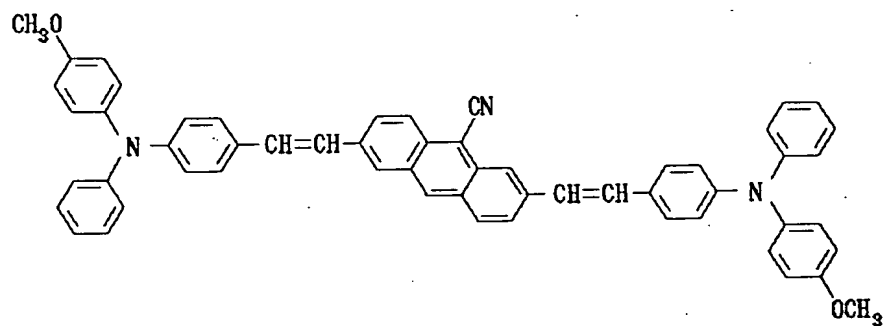
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

25. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 14 or 21, said process yielding a bis(aminostyryl)anthracene compound represented by the structural formula (25)-1, (25)-2, (25)-2', (25)-3, (25)-4, (25)-5, (25)-6, (25)-6', (25)-7, (25)-8, (25)-9, (25)-10, (25)-10', (25)-10'', or (25)-11 below.

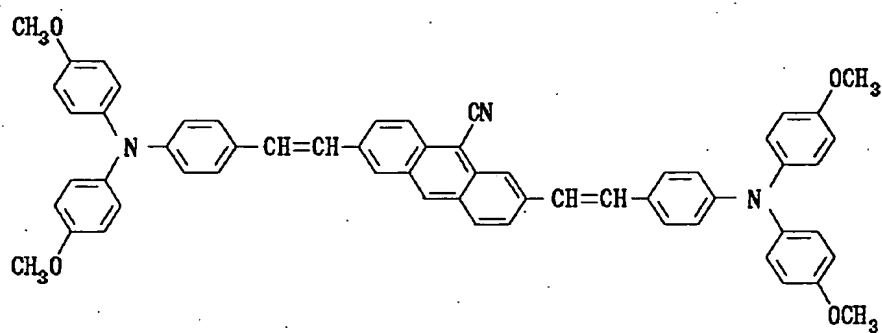
Structural formula (25)-1



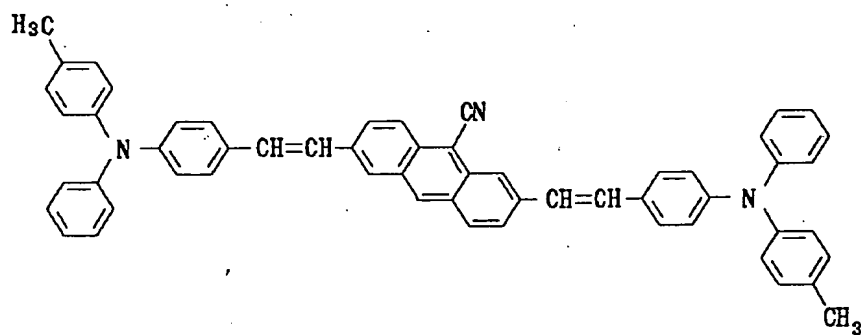
Structural formula (25)-2



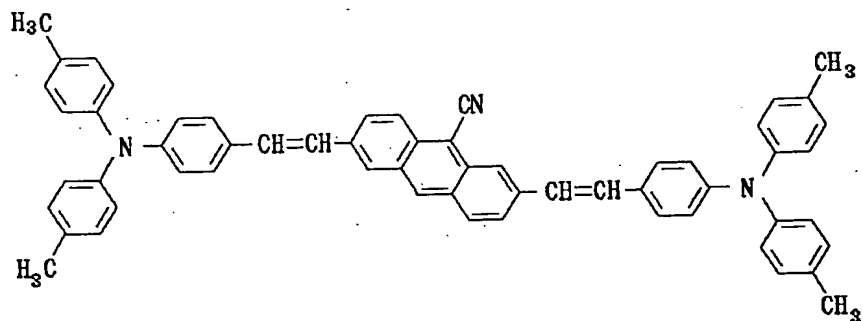
Structural formula (25)-2'



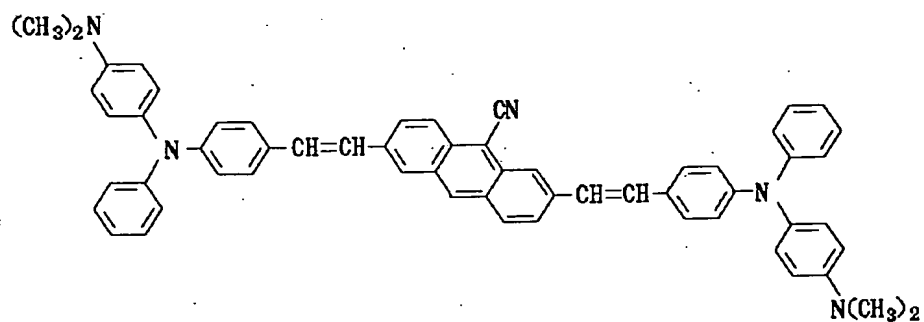
Structural formula (25)-3



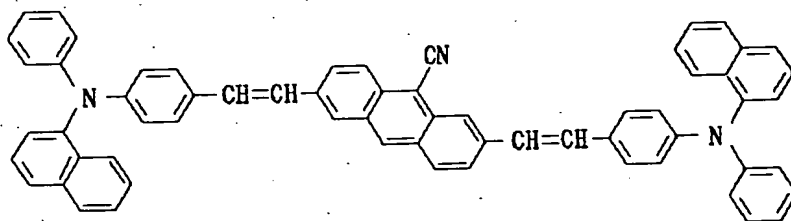
Structural formula (25) - 4



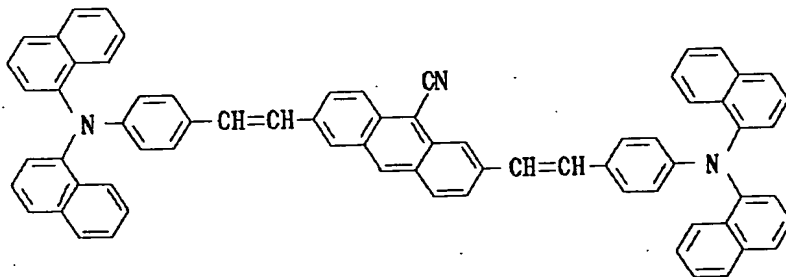
Structural formula (25) - 5



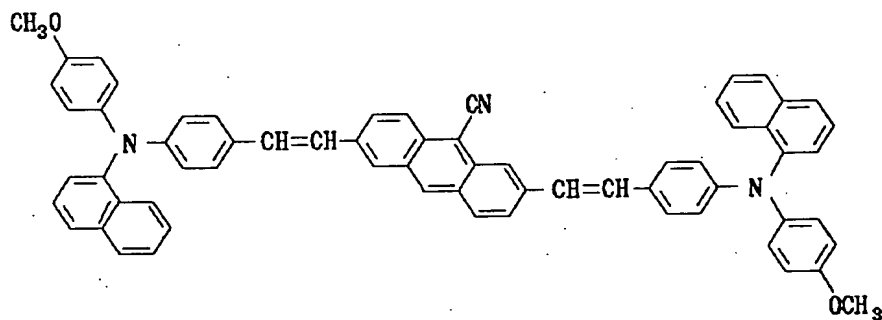
Structural formula (25) - 6



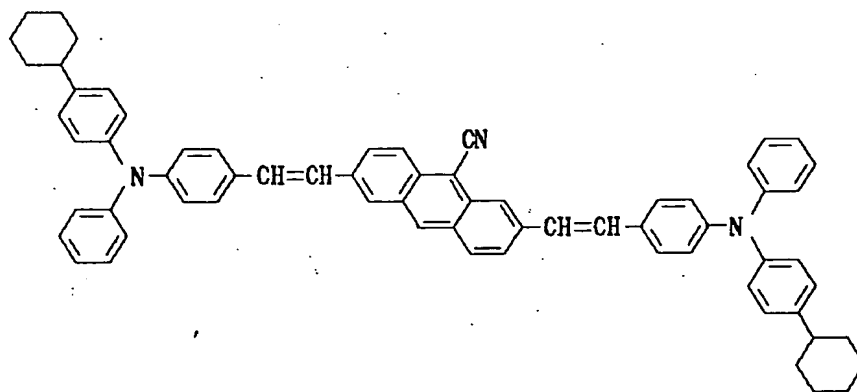
Structural formula (25) - 6'



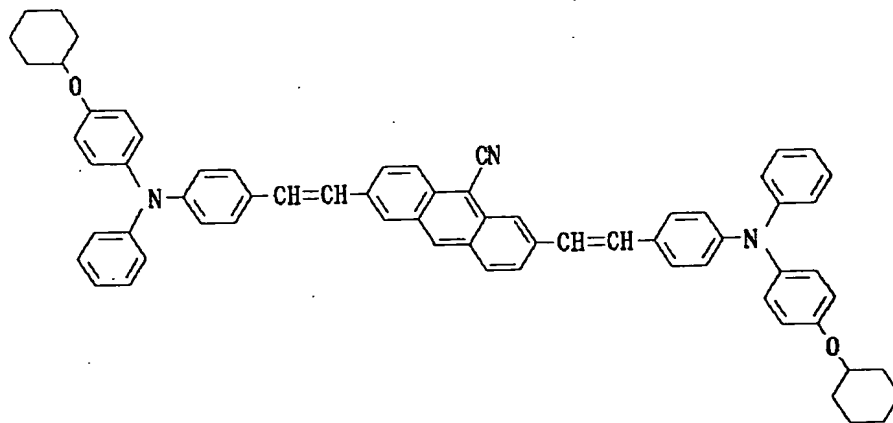
Structural formula (25) - 7



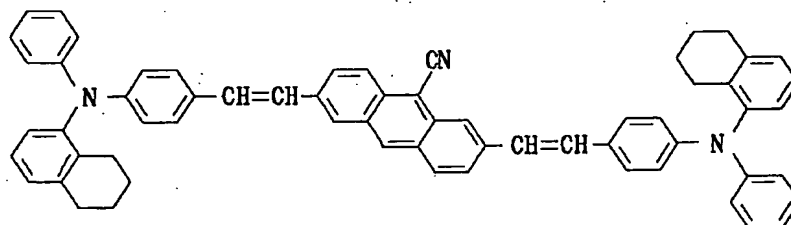
Structural formula (25) - 8



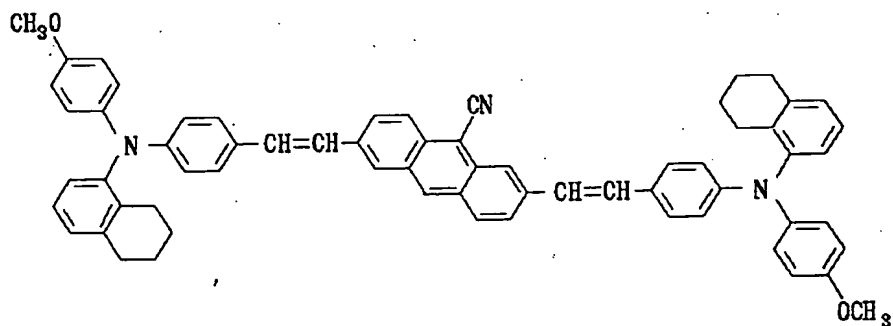
Structural formula (25) - 9



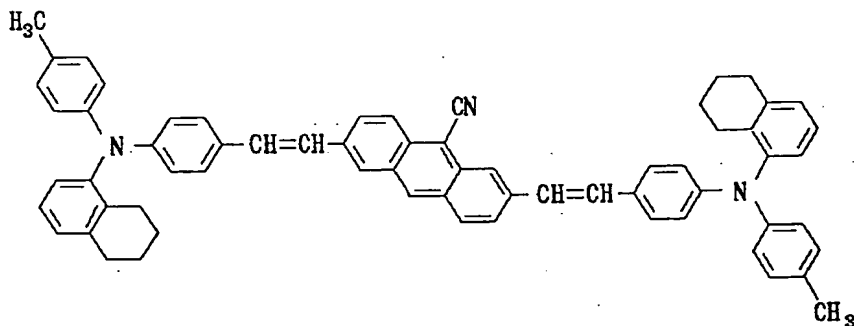
Structural formula (25) - 10



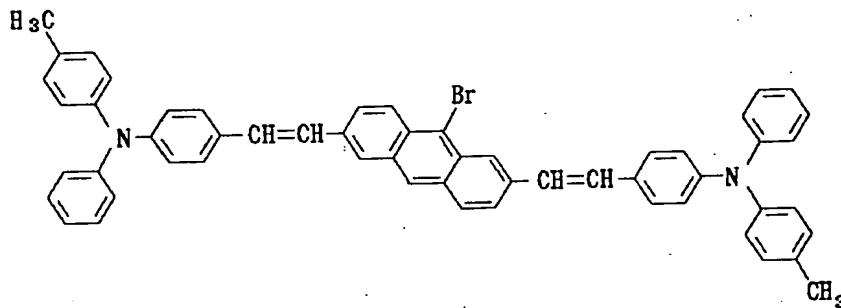
Structural formula (25) - 10'



Structural formula (25) - 10"

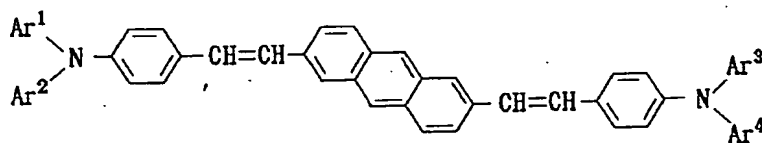


Structural formula (25) - 11



26. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 14, wherein said bis(aminostyryl)anthracene is represented by the general formula (26) below.

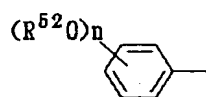
General formula (26)



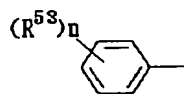
(where Ar¹, Ar², Ar³, and Ar⁴ are identical or different,

each denoting an aryl group which may have a substituent, and if a substituent is present, said aryl group being one which is selected from aryl groups represented by the general formula (7), (8), (9), (10), (11), (12), (12'), or (12'') below.

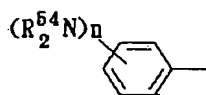
General formula (7)



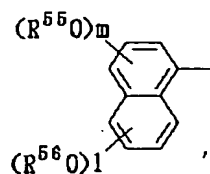
General formula (8)



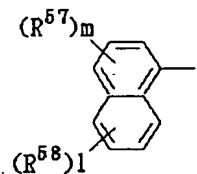
General formula (9)



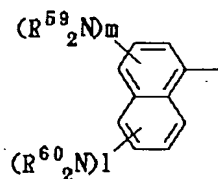
General formula (10)



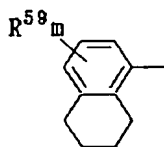
General formula (11)



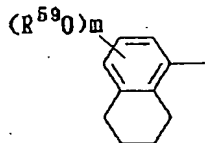
General formula (12)



General formula (12')



General formula (12'')

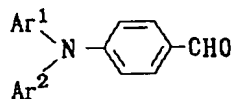


(where R^{52} , R^{53} , and R^{54} each denotes a saturated or unsaturated hydrocarbon group having one or more carbons; R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} are identical or different, each denoting a saturated or unsaturated hydrocarbon

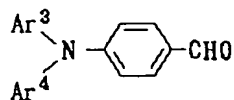
group having one or more carbons; n is an integer of 0 to 6; m is an integer of 0 to 3; and l is an integer of 0 to 4.)

said process comprising condensing at least one species of 4-(N,N-diarylamino)benzaldehyde represented by the general formula (33) or (34) below with diphosphonic ester represented by the general formula (39) below or diphosphonium represented by the general formula (40) below.

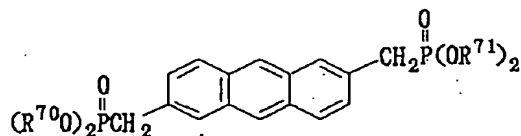
General formula (33)



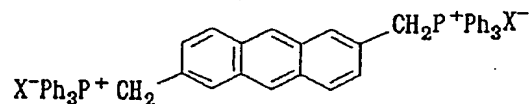
General formula (34)



General formula (39)



General formula (40)



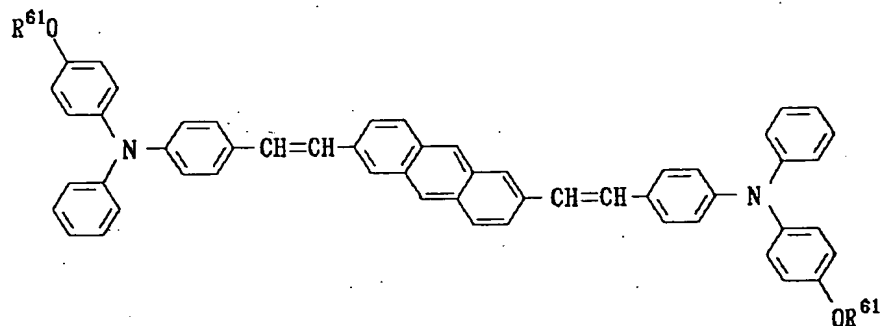
(where Ar^1 , Ar^2 , Ar^3 , Ar^4 , R^{70} , R^{71} and X are defined as above.)

27. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 26, wherein R^{70} and R^{71} each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

28. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 26, wherein R^{52} , R^{53} , R^{54} , R^{55} , R^{56} , R^{57} , R^{58} , R^{59} , and R^{60} each has 1 to 6 carbon atoms.

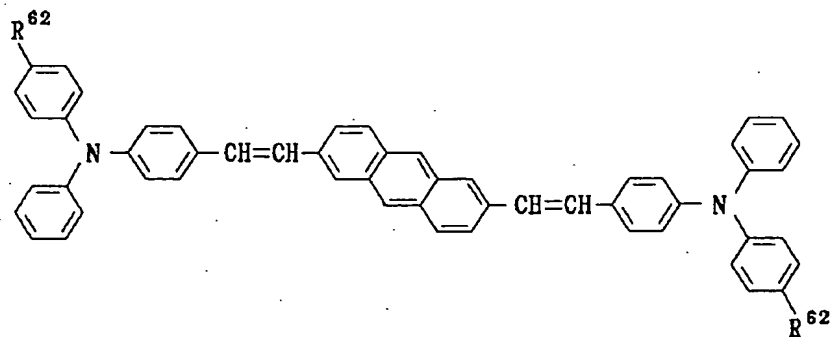
29. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 14 or 26, said process yielding a bis(aminostyryl)anthracene compound represented by the general formula (27), (28), (29), (30), (31), (31') or (31'') below.

General formula (27)



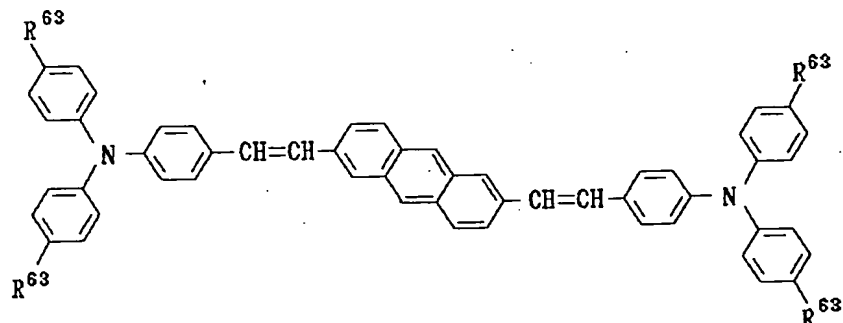
(where R⁶¹ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (28)



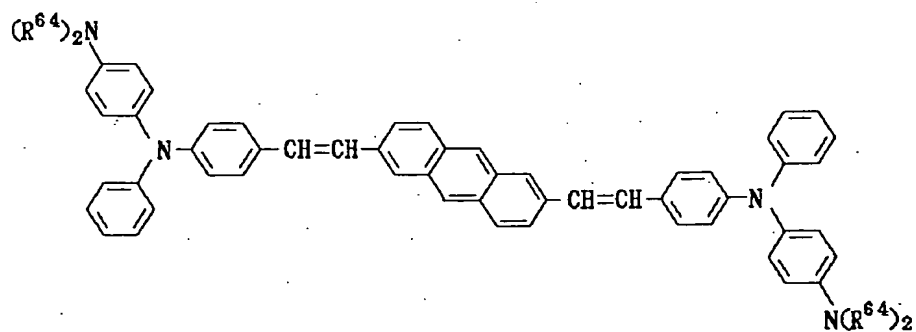
(where R⁶² denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (29)



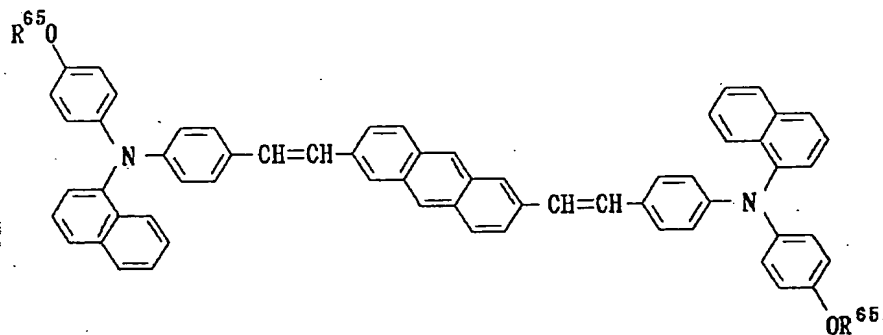
(where R⁶³ denotes a saturated or unsaturated hydrocarbon group or hydrocarbon oxy group having 1 to 6 carbon atoms.)

General formula (30)



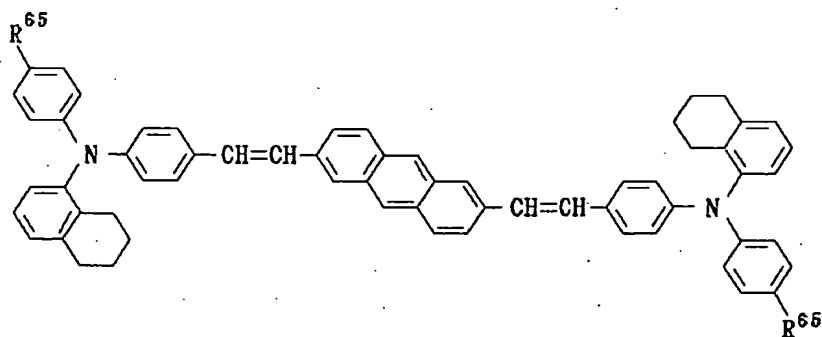
(where R⁶⁴ denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (31)



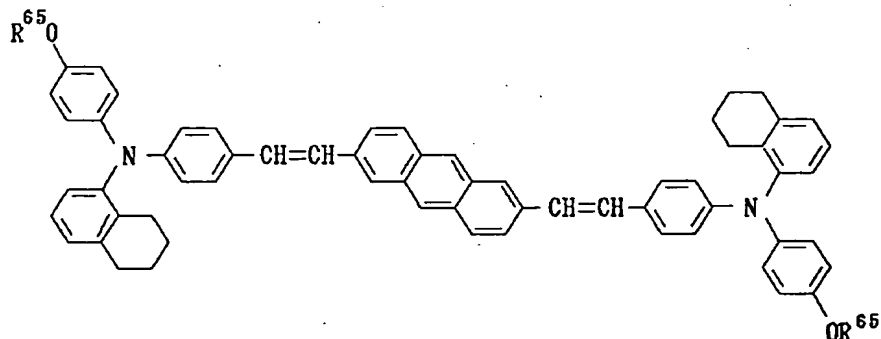
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

General formula (31')



(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

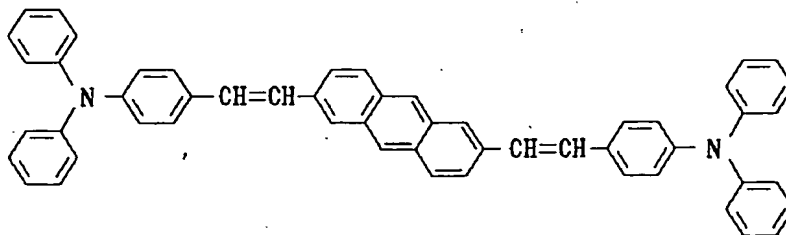
General formula (31")



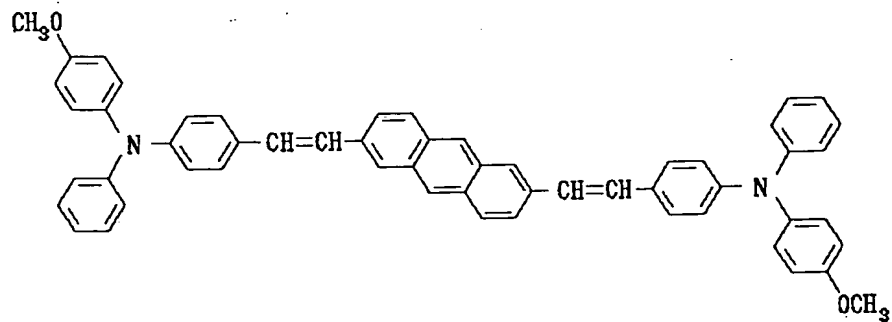
(where R^{65} denotes a saturated or unsaturated hydrocarbon group having 1 to 6 carbon atoms.)

30. A process for producing a bis(aminostyryl)anthracene compound as defined in Claim 14 or 26, said process yielding a bis(aminostyryl)anthracene compound represented by the structural formula (32)-1, (32)-2, (32)-2', (32)-3, (32)-4, (32)-5, (32)-6, (32)-6', (32)-7, (32)-8, (32)-9, (32)-10, (32)-10', or (32)-10" below.

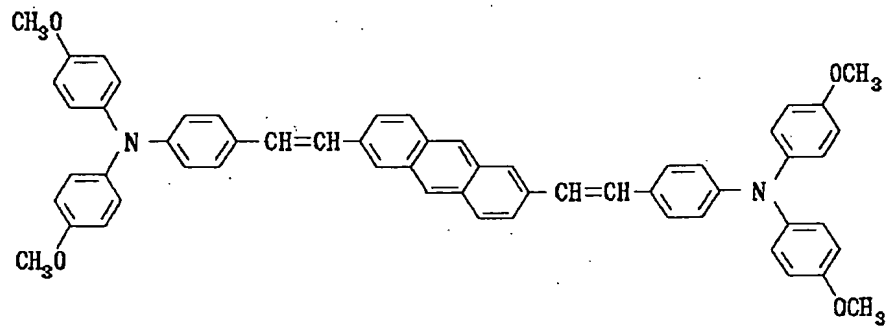
Structural formula (32)-1



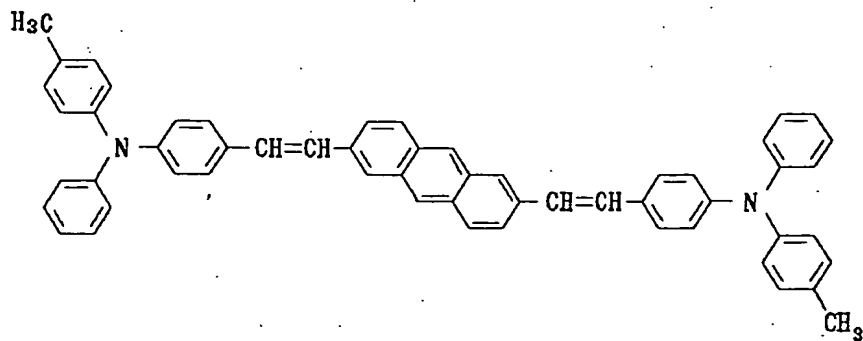
Structural formula (32) - 2



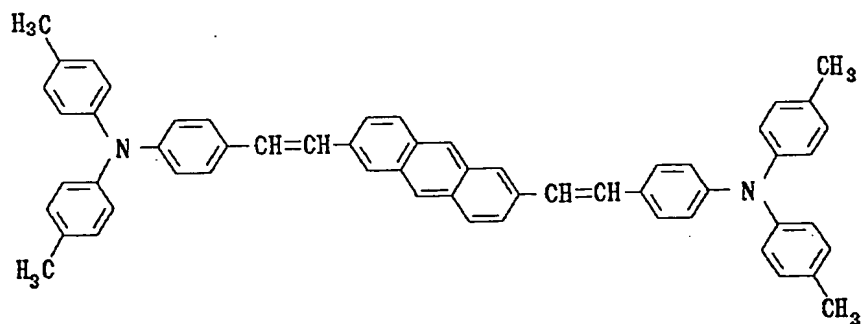
Structural formula (32) - 2'



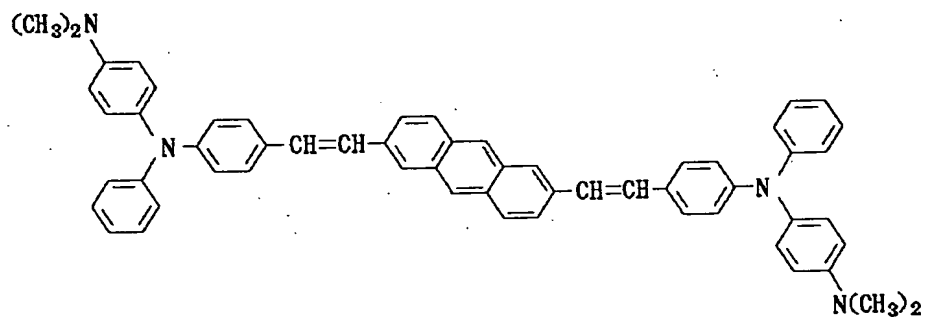
Structural formula (32) - 3



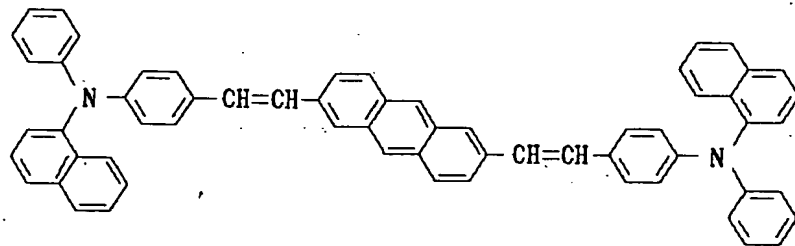
Structural formula (32) - 4



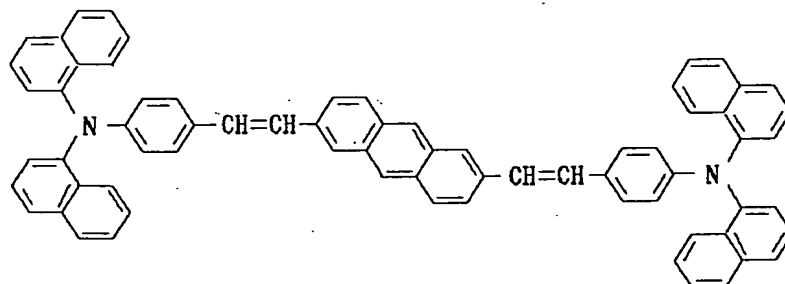
Structural formula (32) - 5



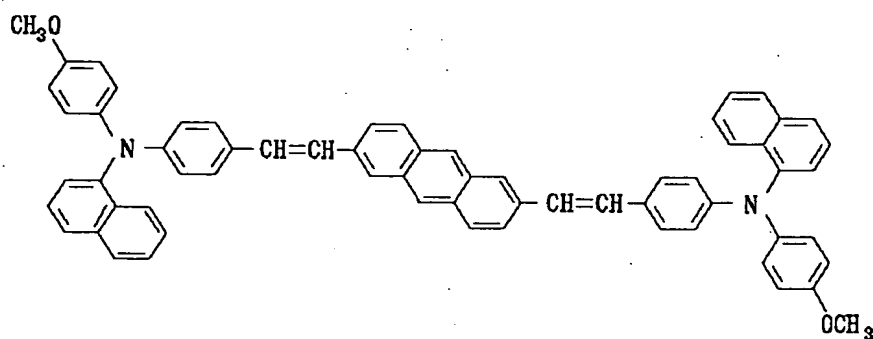
Structural formula (32) - 6



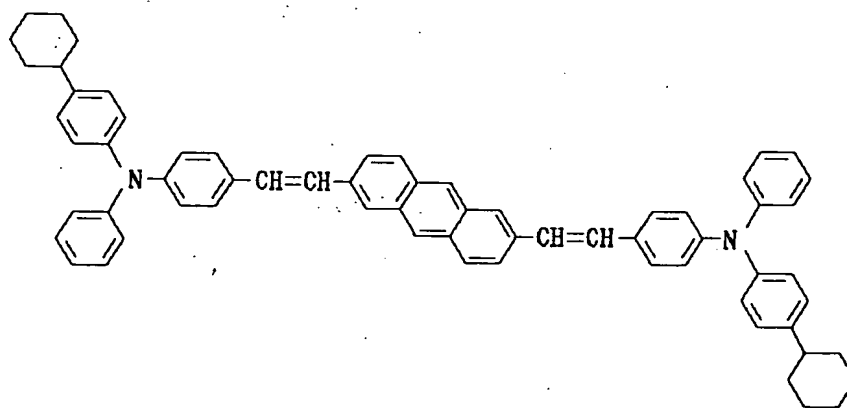
Structural formula (32) - 6'



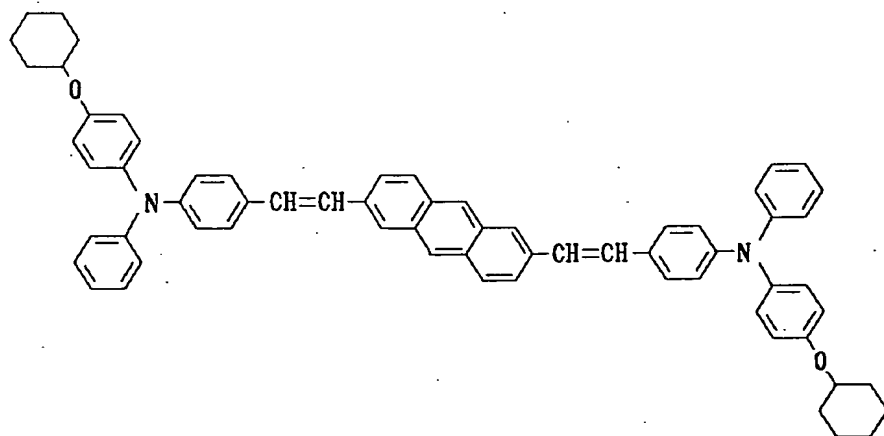
Structural formula (32) - 7



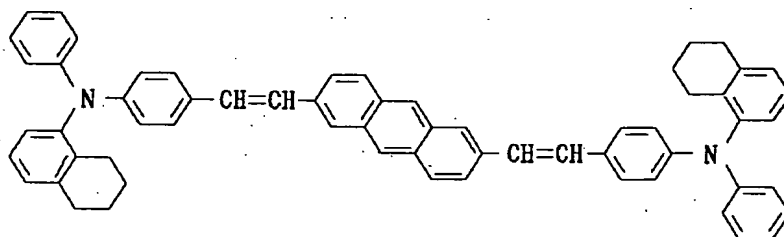
Structural formula (32) - 8



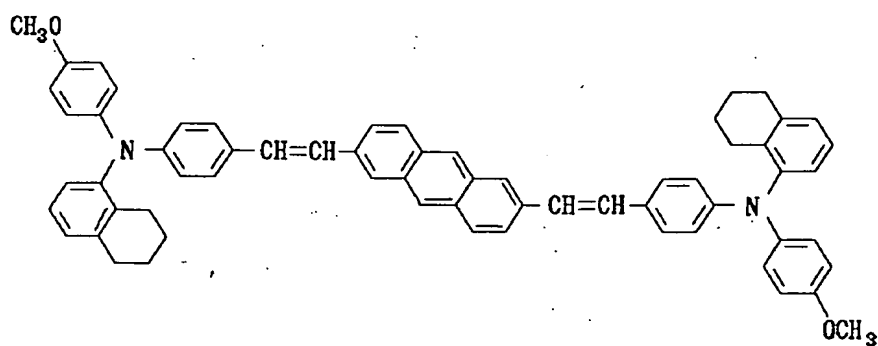
Structural formula (32) - 9



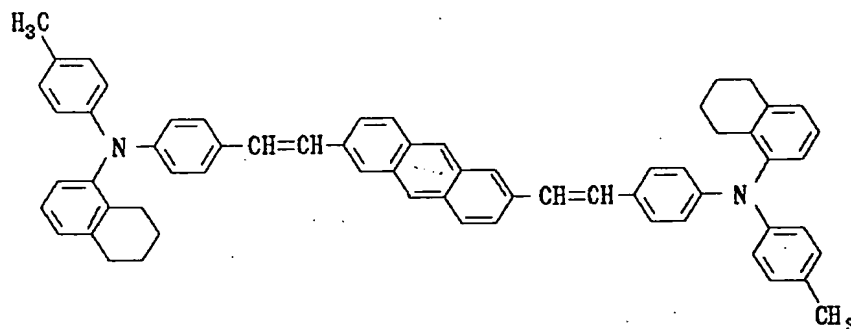
Structural formula (32) - 10



Structural formula (35) - 10'

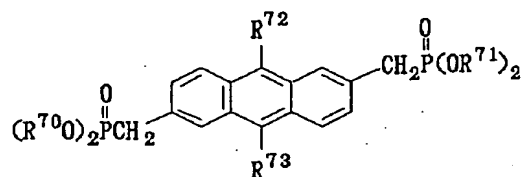


Structural formula (32) - 10"

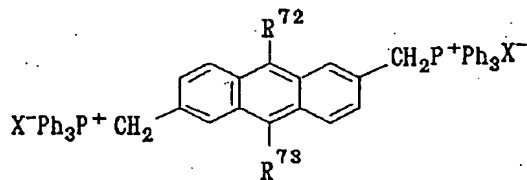


31. A diphosphonic ester or diphosphonium represented by the general formula [VII] or [VIII] below.

General formula [VII]



General formula [VIII]



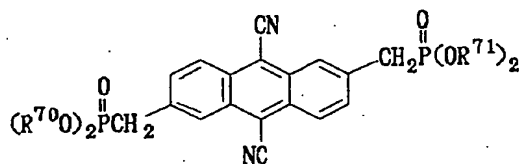
(where R^{70} and R^{71} , are identical or different, each denoting a hydrocarbon group; R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or

halogen atom, and X denotes a halogen atom.)

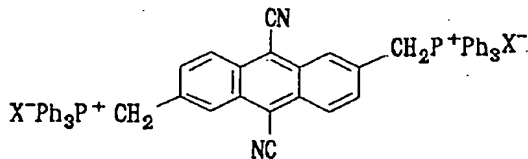
32. A diphosphonic ester or diphosponium as defined in Claim 31, wherein R^{70} and R^{71} each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

33. A diphosphonic ester or diphosponium as defined in Claim 31, which is represented by the general formula (35) or (36) below.

General formula (35)



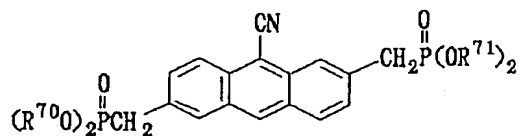
General formula (36)



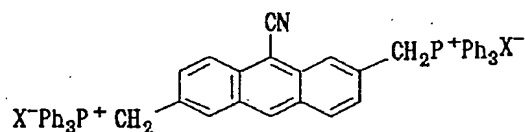
(where R^{70} , R^{71} , and X are defined as above.)

34. A diphosphonic ester or diphosponium as defined in Claim 31, which is represented by the general formula (37) or (38) below.

General formula (37)



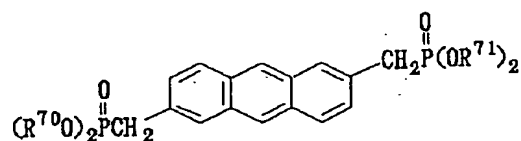
General formula (38)



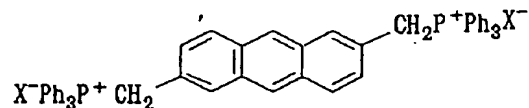
(where R^{70} , R^{71} , and X are defined as above.)

35. A diphosphonic ester or diphosphonium as defined in Claim 31, which is represented by the general formula (39) or (40) below.

General formula (39)



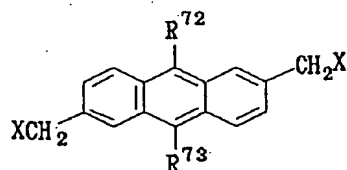
General formula (40)



(where R^{70} , R^{71} , and X are defined as above.)

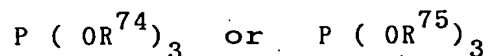
36. A process for producing a diphosphonic ester or diphosphonium represented by the general formula [VII] or [VIII] below, said process comprising reacting an aryl halide compound represented by the general formula [IX] below and a trialkyl phosphite represented by the general formula [X] below or triphenyl phosphine (PPh₃).

General formula [IX]



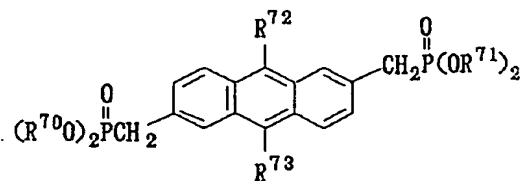
(where R⁷² and R⁷³ are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom, and X denotes a halogen atom.)

General formula [X]

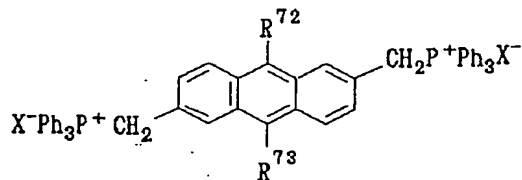


(where R⁷⁴ and R⁷⁵ are identical or different, each denoting a hydrocarbon group.)

General formula [VII]



General formula [VIII]

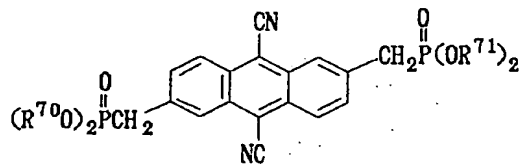


(where R^{70} and R^{71} are identical or different, each denoting a hydrocarbon group; and R^{72} , R^{73} , and X are defined as above.)

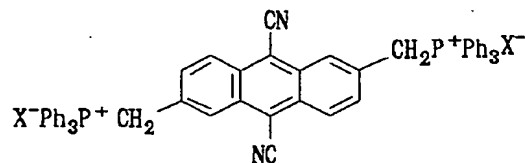
37. A process for producing a diphosphonic ester or diphosponium as defined in Claim 36, wherein R^{70} and R^{71} each denotes a saturated hydrocarbon group having 1 to 4 carbon atoms.

38. A process for producing a diphosphonic ester or diphosponium as defined in Claim 36, said process yielding a diphosphonic ester or diphosponium represented by the general formula (35) or (36).

General formula (35)



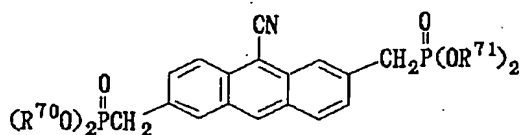
General formula (36)



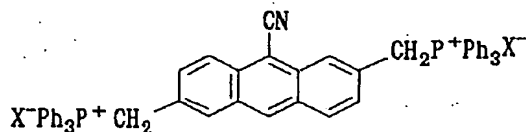
(where R^{70} , R^{71} , and X are defined as above.)

39. A process for producing a diphosphonic ester or diphosponium as defined in Claim 36, said process yielding a diphosphonic ester or diphosponium represented by the general formula (37) or (38).

General formula (37)



General formula (38)

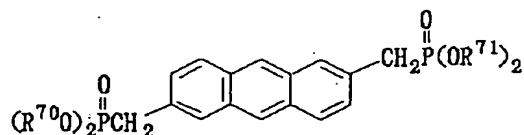


(where R^{70} , R^{71} , and X are defined as above.)

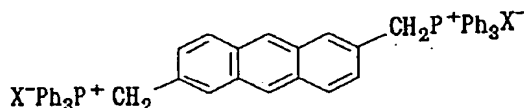
40. A process for producing a diphosphonic ester or diphosponium as defined in Claim 36, said process yielding a diphosphonic ester or diphosponium

represented by the general formula (39) or (40).

General formula (39)



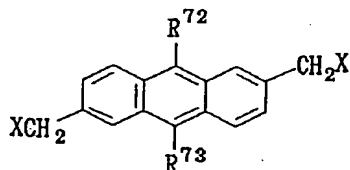
General formula (40)



(where R^{70} , R^{71} , and X are defined as above.)

41. An aryl halide compound represented by the general formula [IX] below.

General formula [IX]

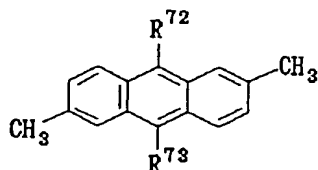


(where R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

42. A process for producing an aryl halide compound represented by the general formula [IX] below, said process comprising reacting an anthracene compound

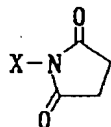
represented by the general formula [XI] below with an N-halogenated succinimide represented by the general formula [XII] below.

General formula [XI]



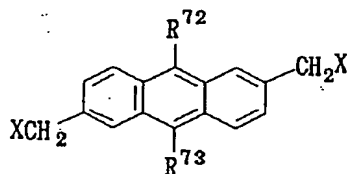
(where R^{72} and R^{73} are identical or different, at least one of them denoting a hydrogen atom, cyano group, nitro group, trifluoromethyl group, or halogen atom.)

General formula [XII]



(where X denotes a halogen atom.)

General formula [IX]



(where R^{72} and R^{73} are defined as above, and X denotes a halogen atom.)